The Air Force Chief of Staff Logistics Review

Improving Wing-Level Logistics

Kristin F. Lynch, John G. Drew
David George, Robert S. Tripp
C. Robert Roll, Jr., James Leftwich

RAND PROJECT AIR FORCE

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Prepared for the United States Air Force
Approved for public release, distribution unlimited

RAND PROJECT AIR FORCE

The research reported here was sponsored by the United States Air Force under Contract F49642-01-C-0003. Further information may be obtained from the Strategic Planning Division, Directorate of Plans, Hq USAF.

Library of Congress Cataloging-in-Publication Data

The Air Force Chief of Staff logistics review : improving wing-level logistics / Kristin Lynch.
p. cm.
"MG-190."
Includes bibliographical references.
ISBN 0-8330-3658-0 (pbk. : alk. paper)
1. United States. Air Force—Operational readiness. 2. United States. Air Force—Supplies and stores. 3. Airplanes, Military—United States—Maintenance and repair. I. Lynch, Kristin. II. United States. Dept. of the Air Force. Chief of Staff.

UG1103.A36 2005
358.4'1411'0973—dc22

2004017040

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Published 2005 by the RAND Corporation
1776 Main Street, P.O. Box 2138, Santa Monica, CA 90407-2138
1200 South Hayes Street, Arlington, VA 22202-5050
201 North Craig Street, Suite 202, Pittsburgh, PA 15213-1516
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Preface

This report describes a review conducted by the Air Force and the RAND Corporation called the Chief's Logistics Review (CLR). Somewhat different from a typical RAND study, this was a joint effort in which RAND acted as analytic advisor to the Air Force. This effort was directed, in October 1999, by Gen Michael E. Ryan, then Chief of Staff of the Air Force (CSAF), to develop improvement options to mitigate logistics problems that had arisen in the 1990s. CLR was placed under the overall direction of Gen John W. Handy, then Deputy Chief of Staff, Installations and Logistics, who asked RAND to develop the analytic approach for the review, choosing RAND because of its previous research and the confidence of senior Air Force leaders.

In response to ongoing concerns about declining readiness trends in aircraft maintenance, General Ryan directed CLR. In providing guidance for the review, General Ryan emphasized looking at process and training deficiencies within existing organizations and directed that the study focus on identifying actions required to resolve such deficiencies. This report provides background material on CLR and describes both the analytic approach (including RAND's role in its development) and the results from this review of Air Force wing-level logistics processes. The background material covers both the initial phase of the study, in which the proposed improvements were determined, and the second phase of the study, in which the improvements were field tested.

This report also provides insights gained through the study that should be useful to future generations of logisticians, operators, and planners throughout the Department of Defense, particularly those in the Air Force, who struggle with the challenges of maintaining the most ready and capable aircraft fleet in the face of new threats and resource environments. It may prove useful to such personnel across the Department of Defense, as well.

The research addressed in this report was conducted in the Resource Management Program of RAND Project AIR FORCE. The Air Force Deputy Chief of Staff, Installations and Logistics, sponsored this project.

RAND Project AIR FORCE

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Contents

Figures

Tables

Summary

In response to indicators of declining readiness, heightened operations tempo, and evolving force employment concepts, the Chief of Staff of the Air Force (CSAF) initiated a review of Air Force wing-level logistics processes. This review, called the Chief's Logistics Review (CLR), was designed to target process and process-enabler shortfalls that limited the logistics community's ability to meet increasing readiness demands. This report presents background information and describes the analytic approach (including the RAND Corporation's role in its development) and results of CLR (Phase 1), and it describes how solution options designed to improve wing-level logistics processes were tested and evaluated (Phase 2). This effort was unlike a typical RAND study in that it was a joint effort, with RAND acting as an analytic advisor to the Air Force. RAND was chosen to develop the analytic approach for this review because of its previous research and the confidence of senior Air Force leaders. RAND's involvement was meant to ensure that the CSAF received all potential options and a costs/benefits analysis for each option.

The primary catalyst for CLR was a briefing sponsored by Gen John P. Jumper, then Commander, United States Air Forces Europe (USAFE/CC), in September 1999. Entitled "Posturing Aircraft Maintenance for Combat Readiness" and stemming in part from experiences during Operation Allied Force/Operation Noble Anvil, the briefing illustrated declining readiness trends, degraded warfighting skills, and impaired Air and Space Expeditionary Force (AEF) implementation. The view presented was one of declining readiness be-

cause of lines of authority that were too fragmented to ensure proper control of aircraft maintenance processes at the Air Force wing level. The recommended solution was a focused wing structure with a separate maintenance group controlling all facets of wing maintenance, an organizational structure similar to the one that had been in place before Gen Merrill McPeak had ordered it changed to the Objective Wing structure in the early 1990s.[1]

In response to the USAFE/CC presentation and other ongoing concerns about declining readiness trends in aircraft maintenance, Gen Michael E. Ryan, CSAF, directed CLR. In providing guidance for the study, General Ryan questioned the contention that changes to current organizations were required to eliminate the root causes of declining readiness trends in aircraft maintenance. He emphasized instead that existing organizations should be looked at for process and training deficiencies, and he directed that the study focus on identifying actions required to resolve such deficiencies. The CSAF set the following guidelines for the review:

- Evaluate processes rather than organizations.
- Examine centralized versus decentralized execution for home/deployed forces.
- Gather insights from both logisticians and operators.
- Develop changes/adjustments within constrained funding boundaries.
- Develop metrics to compare solution options against the AEF operational goals.
- Identify accompanying benefits, costs, and risk.

Within these CSAF guidelines, RAND, as analytic advisor in a study run by the Air Force, related process analysis to AEF operational goals as a framework for the review. The AEF operational goals, as identified in previous research, are as follows:

[1] For more details and a historical perspective of the organizational structure of maintenance in the Air Force, see Appendix G.

- Rapidly configure support.
- Quickly deploy large and small tailored force packages with the capability to deliver substantial firepower anywhere in the world.
- Immediately employ these forces upon arrival.
- Smoothly shift from deployment to operational sustainment.
- Meet the demands of small-scale contingencies and peacekeeping commitments while maintaining readiness for potential contingencies outlined in defense guidance.[2]

CLR incorporated a structured methodology focused on identifying process problems and presenting options for their correction. Active major command (MAJCOM) participation and a sequential review process were used. Throughout the process, MAJCOM inputs were solicited and used to refine potential solutions for consideration by senior Air Force leaders.

During the course of the review, the CSAF maintained his focus on effecting proper process and training improvements within the existing Objective Wing maintenance structure for the Combat Air Force. He did not seek to realign sortie production and fleet management processes by putting them under a single authority, an approach frequently recommended by MAJCOMs.[3] He further directed that the focus be on officer development in order to identify the subject matter content and level of training necessary at various stages in career progression. He emphasized that the study should lead to an identification of what and how much maintenance knowledge both fighter pilots and maintainers need to go to war. He did not object to minor realignments to improve process efficiencies. He agreed to some policy changes, many major training improvements, and some minor process realignments.

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[2] Tripp, Robert S., et al., *Supporting Expeditionary Aerospace Forces: A Concept for Evolving to the Agile Combat Support/Mobility System of the Future*, MR-1179-AF, RAND Corporation, Santa Monica, CA, 2000.

[3] Although recommended by the MAJCOMs, General Ryan, CSAF during CLR Phase 1, was opposed to major organizational change or realignment. In his opinion, there had been enough major reorganizations within the Air Force, and he did not want to make any further significant changes.

The underlying theme for the analysis was the challenge of balancing the near-term sortie production requirements with the long-term fleet health necessary to meet future requirements. MAJCOMs recognized that day-to-day sortie production was often taking priority over scheduled maintenance tasks (for example, training, phase maintenance, and time-critical technical order changes) seen as essential for investing in future capability.

Following a series of reviews, a set of solution options was finalized and presented to senior leadership. The options proposed for maintenance targeted minor process realignments and investments in process enablers that would aid in achieving the near-term/long-term balance sought. Options for improving Supply, Transportation, and Logistics Plans were also proposed. Also the result of MAJCOM inputs and RAND analysis, these options included streamlining the wing-level distribution process by integrating Supply and Transportation into a single organization and improving wing-level contingency planning and execution by creating a standard structure for the logistics planners within the wing.

Options for Improving Wing-Level Logistics (see pp. 7–17)

CLR Phase 1 resulted in a set of improvement options that targeted four areas: maintenance, materiel management, contingency planning and execution, and technical training and officer development. Air Force leadership approved the following initiatives by targeted area, and all selected initiatives (in bold below) were then evaluated during the implementation test (Phase 2).

The approved maintenance initiatives were designed to improve the ability to balance near-term sortie production requirements with long-term fleet health requirements, with the end result of ensuring future readiness. These initiatives were as follows:

- **Increase emphasis on sortie production and fleet health processes by aligning sortie production functions under the Opera-**

tions Group and fleet health functions under the Logistics Group.

- **Develop and enforce policy for current versus future readiness tradeoff analysis.**
- **Improve maintenance policy.**
- Develop a Senior Leaders' Metrics handbook.
- Improve enlisted maintenance training.
- Improve officer (logistics and rated) maintenance training.
- Pursue centralized intermediate repair facilities for wartime and peacetime.

For materiel management, the intent of the approved initiatives was to improve wing-level distribution:

- Provide guidance for materiel management pipeline analysis.
- Improve Regional Supply Squadron (RSS) policy.
- Develop training on RSS processes, tools, and metrics.
- **Create a single authority for the distribution process by integrating the wing-level supply and transportation squadrons.**
- Pursue enhanced combat support execution planning and control (CSC2) at regional activities.

For contingency planning, the approved initiatives were to improve the wing-level deployment planning and execution process:

- Create and report metrics for contingency planning against AEF goals.
- Improve policy for deployments and site surveys.
- Create a Joint Operations Planning and Execution System certification policy.
- **Standardize throughout the Air Force the alignment of Logistics Plans by placing them within the Logistics Group.**

For technical training and officer development, the approved initiatives were aimed at improving the skills and knowledge of the workforce:

- Increase the availability of training managers.
- Standardize nonrepetitive maintenance/deployment training tasks.
- Change Air Force recurring training timing to coincide with AEF cycles.
- Define logistics officer career paths into two tracks.
- Improve cross-flow management.
- Develop Weapons School–type training for logistics officers.

Implementation Test (see pp. 19–25)

Air Staff prepared a CLR presentation for the newly appointed AF/IL, Lt Gen Michael E. Zettler, to take to the CSAF for approval. The options were subsequently put forth in a presentation at the Fall CORONA in early October 2000, where a decision was made to evaluate the selected options during a six-month implementation test at a limited number of bases. RAND was asked to analyze the test and provide feedback to the Air Force on the test results. The implementation test was conducted for six months, from September 2001 to March 2002.

The implementation test was designed to evaluate the plan for implementing CLR initiatives Air Force–wide and to ensure that changes did not negatively impact wing-level operations. In this case, a successful test was defined as one in which an initiative was implemented without causing unintended consequences. Against that criterion, the CLR implementation test was a success in that there were no detrimental consequences from implementing CLR initiatives. Specific issues do warrant consideration, however, as follows.

Sortie Production and Fleet Health (see pp. 27–51)

- Encourage and facilitate the use of metrics to balance daily sortie production and long-term fleet health management at the wing level.
- Consider implementing additional maintenance and maintenance management policy improvements, and additional job performance aids, and further refine training and education opportunities.
- Consider implementing additional activities to monitor, measure, and evaluate policy enforcement.
- Proceed with Air Force–wide implementation of CLR sortie production/fleet health initiatives and consider alternatives to further enhance maintenance process execution.

Materiel Management and Contingency Planning (see pp. 53–91)

- Consider revisiting the Logistics Readiness Squadron (LRS) restructure from the viewpoint of maintaining the integrity of the distribution process as it is defined and conceptualized by Air Force theater distribution needs.
- Consider re-evaluating the Vehicle Management Flight and the possibility that the LRS restructure may have had an unintended adverse effect specifically on the transportation enlisted career field.
- Consider aligning core functions associated with deployment planning and execution, force reception, and force beddown in an organization specifically focused on those AEF-critical processes.
- Consider creating new metrics that focus on the distribution process with related segments and, in turn, show how the base-level distribution process fits into the larger global/theater distribution process.

Acknowledgments

Many people inside and outside the Air Force provided valuable assistance and support to our work during the Chief's Logistics Review (CLR). We thank former Air Force Chief of Staff Gen Michael E. Ryan (Ret) for initiating this study, and Gen John W. Handy, Commander, United States Transportation Command, for his support while serving as Deputy Chief of Staff, Installations and Logistics (AF/IL). Lt Gen Michael E. Zettler provided insightful guidance and continued support as General Handy's successor.

We would like to give special thanks to Maj Gen Scott C. Bergren, Director of Logistics and Air Staff, Director of Maintenance (AF/ILM), for his guidance and support when the review was initiated. We also afford special thanks to Maj Gen Terry Gabreski for her guidance and thoughtful insights as United States Air Forces Europe (USAFE), Director of Logistics and Air Staff, Director of Maintenance (AF/ILM). Additionally, we thank Brig Gen Ann Harrell, Major General Gabreski's successor as AF/ILM. A special thanks to Col Glenn Locklear and Col Mark Atkinson, both of whom provided support during their tenures as AF/ILMM. And a special thanks to the CLR action and implementation officers: Lt Col Jim Silva, Col Tom Hixon, Lt Col Russ Hall, Lt Col Lorraine Souza, Maj Martha Pruitt, and Maj Jennifer Hall. All of these officers provided great support, insight, and timely guidance.

We are especially grateful to the major air command participants who brought their command views to the meetings and video teleconferences. In particular, we wish to thank the following people from across the Air Force for their hard work and candid discussions: Col Hugh Robinson, Air Combat Command (ACC); Col Jim Russell, Col Carl Lewandowski, and Capt Kenneth Timko of Air Mobility Command (AMC); Col Pam Carter and Col Ron Ayler, Pacific Air Forces (PACAF); Col Al Tinianow, Air Force Space Command (AFSPC); Col Doug Beckwith and Lt Col Steve Brunin, Air Education and Training Command (AETC); Col Gerald Micheletti, Air Force Reserve Command (AFRC); Col John Haller, Air Force Special Operations Command (AFSOC); Col Gary McCoy and Col Gary Ryden, Air Force Materiel Command (AFMC); Col Rick Kind and Maj Ray Lindsay, USAFE; Col John P. Moore, Robins Air Force Base; Mr. Rich Rico and Ms. Victoria Vanburen, Air National Guard; and Mr. Thomas Girz, AF/ILMM.

This analysis would not have been possible had it not been for the time and honesty of the many Air Force logisticians we interviewed on our site visits during the implementation testing. The support we received from these people—from senior leaders to airmen on the flightline—contributed immensely to our research.

Our research was a team effort with the Air Force Logistics Management Agency (AFLMA); the support of the AFLMA was critical to the conduct of this research. We thank Col Ronne Mercer, AFLMA/CC; Lt Col Mark McConnell, AFLMA/LGM; and Lt Col Jeff Neuber, AFLMA/LGX. We especially thank Maj Cauley von Hoffman, AFLMA/LGM, for her assistance.

Additionally, we would like to thank the RAND Corporation and Air Force staff members who assisted in the writing, correlation, publication, and transmission of the various reports, messages, and other documents created during this study effort. First and foremost, we thank Logan J. Bennett, Robert DeFeo, Suzanne Gehri, and Ken Evers for their contributions to data gathering and report publication. We also thank RAND colleagues Ray Conley and John Folkeson for providing thoughtful reviews and critiques of our work, and we thank Richard Bereit for his thorough review and evaluation of the report. Thanks also go to Richard M. Moore, Hy Shulman, Don Palmer, Viki Halabuk, Mechelle Wilkins, Dahlia Lichter, and Suzanne Newton, all of RAND, for their tireless contributions. Special thanks go to Gina Sandberg for working many hours to prepare numerous project memoranda, as well as the many iterations of this document that led to its final form.

Abbreviations and Acronyms

2R	Remove and Replace
A&E	Armament & Electronics
AAC	Army Air Corps
AB	Air Base
ACC	Air Combat Command
ADC	Air Defense Command
AEF	Air and Space Expeditionary Force
AETC	Air Education and Training Command
AFB	Air Force Base
AFI	Air Force Instructions
AF/IL	Deputy Chief of Staff, Installations and Logistics
AFLMA	Air Force Logistics Management Agency
AFM	Air Force Manual
AFMC	Air Force Materiel Command
AFR	Air Force Regulation
AFRC	Air Force Reserve Command
AFSC	Air Force Specialty Code
AFSOC	Air Force Special Operations Command
AFSPC	Air Force Space Command
AGE	Aerospace Ground Equipment
AGS	Aircraft Generation Squadron
AIS	Avionics Intermediate Shops

AMC	Air Mobility Command
AMU	Aircraft Maintenance Unit
ANG	Air National Guard
AOR	Area of Responsibility
ATC	Air Training Command
AWOS	Air War Over Serbia
CAF	Combat Air Force
CANN	Cannibalization
CATF	Combined Airlift Task Force
CC	Commander
CIRF	Centralized Intermediate Repair Facility
CLR	Chief's Logistics Review
CMS	Component Maintenance Squadron
COMO	Combat Oriented Maintenance Organization
CONUS	Continental United States
CP	Contingency Planning
CRS	Component Repair Squadron
CSAF	Chief of Staff of the Air Force
CSC2	Combat Support Execution Planning and Control
CSL	Core Support Location
CWT	Customer Wait Time
DCM	Deputy Commander for Maintenance
DIFM	Due In For Maintenance
DoD	Department of Defense
DOGM	Deputy for Operations Group Maintenance
DPG	Defense Planning Guidance
DS/DS	Desert Shield/Desert Storm
EAF	Expeditionary Air Force
ECM	Electronic Counter Measures
EMS	Equipment Maintenance Squadron
FH	Fleet Health

FMC	Fully Mission Capable
FMS	Field Maintenance Squadron
FOL	Forward Operating Location
FS	Flying Squadron
FSE	Flying Schedule Effectiveness
FSL	Forward Support Location
FTD	Field Training Detachment
HQ	Headquarters
IAF	Israeli Air Force
IDO	Installation Deployment Officer
IG	Inspector General
IM	Intermediate Maintenance
ISO	Isochronal inspection
JC	Job Control
JMOC	Joint Maintenance Operations Centers
JOPES	Joint Operations Planning and Execution System
JPA/JPG	Job Procedural Aid and Guide
KRA	Key Result Area
LG	Logistics Group
LRS	Logistics Readiness Squadron
LSS	Logistics Support Squadron
MAC	Military Airlift Command
MAF	Mobility Air Force
MAJCOM	Major Command
MATS	Military Air Transport Service
MC	Mission Capable
MDS	Mission Design Series
MDSA	Maintenance Data Systems Analysis
MM	Materiel Management
MMS	Munitions Maintenance Squadrons
MOC	Maintenance Operations Center

MOD	Maintenance Operations Division
MOO	Maintenance Operations Officer
MPIP	Maintenance Posture Improvement Program
MSE	Maintenance Scheduling Effectiveness
MSL	Maintenance Supply Liaison
MTBF	Mean Time Between Failure
MXS	Maintenance Squadron
NCO	Noncommissioned Officer
NCOIC	Noncommissioned Officer In Charge
NMCM	Not Mission Capable Maintenance
OG	Operations Group
OJT	On-The-Job Training
OMS	Organizational Maintenance Squadron
ORI	Operational Readiness Inspection
OSS	Operations Support Squadron
PACAF	Pacific Air Forces
PAF	Project AIR FORCE
PCS	Permanent Change of Station
PMS	Periodic Maintenance Squadron
POMO	Production Oriented Maintenance Organization
PS&D	Plans, Scheduling, and Documentation
QA	Quality Assurance
QVI	Quality Verification Inspection
REMCO	Rear Echelon Maintenance Combined Operation
ROLS	Readiness Oriented Logistics System
RSS	Regional Supply Squadron
SAC	Strategic Air Command
SEA	Southeast Asia
SEI	Special Experience Identifier
SNCO	Senior Non-Commissioned Officer
SP	Sortie Production

ST/BIT	Self-Test/Built-in-Test
TAC	Tactical Air Command
TAF	Tactical Air Forces
TCTO	Time Compliance Technical Order
TDI	Time Distribution Interval
TMO	Traffic Management Office
TNMCM	Total Not Mission Capable Maintenance
TNMCS	Total Not Mission Capable Supply
ToO	Target of Opportunity
UDM	Unit Deployment Manager
USAF	United States Air Force
USAFE	United States Air Forces Europe
USM	Unscheduled Maintenance
UTE	Utilization
WMP	War Mobilization Plan
WMU	Weapons Maintenance Unit
WOC	Wing Operations Center
WRM	War Reserve Materiel
XP	Wing Plans

CHAPTER ONE

Introduction

This report provides background information and describes the analytic approach (including the RAND Corporation's role in its development) and results of an Air Force review of wing-level logistics processes. The review was conducted to develop improvement options to mitigate logistics support problems that had surfaced during the 1990s. This study was directed by Gen Michael E. Ryan, then Chief of Staff of the Air Force (CSAF), in October 1999, and was named the Chief's Logistics Review (CLR). CLR was placed under the overall direction of Gen John W. Handy, then Deputy Chief of Staff, Installations and Logistics (AF/IL).

General Handy asked RAND to assist in conducting the study. The arrangement was not typical of a RAND study; this was a joint effort in which RAND acted as an analytic advisor to the Air Force. Previous RAND research and the confidence of senior Air Force leaders led to RAND's being chosen to develop the analytic approach for this review. RAND was involved to ensure that the CSAF received all potential options and a costs/benefits analysis for each option.

The primary catalyst for CLR was a briefing, "Posturing Aircraft Maintenance for Combat Readiness," presented in September 1999 by Gen John P. Jumper, then Commander, United States Air Forces Europe (USAFE/CC). Stemming partly from experiences during Operation Allied Force/Operation Noble Anvil, the briefing illustrated declining readiness trends, degraded warfighting skills, and impaired air and space expeditionary force (AEF) implementation. The view presented was one of declining readiness caused by lines of authority being too fragmented to ensure proper control of aircraft maintenance processes at the Air Force wing level. A focused wing structure with a separate maintenance group controlling all facets of wing maintenance was recommended as a solution to declining readiness. This structure was similar to the one that had existed before Gen Merrill McPeak ordered it changed to the Objective Wing structure in the early 1990s.[1]

In response to the USAFE/CC presentation and other ongoing concerns about declining readiness trends in aircraft maintenance, General Ryan directed CLR. In providing guidance for the review, General Ryan questioned the contention that the root causes of declining readiness trends in aircraft maintenance could be eliminated only by making changes to current organizations. Instead, he emphasized the need to look at process and training deficiencies within existing organizations, and he directed that the study focus on identifying actions to resolve such deficiencies. The CSAF set the following guidelines for the review:

- Evaluate processes rather than organizations.
- Examine centralized versus decentralized execution for home/deployed forces.
- Gather insights from both logisticians and operators.
- Develop changes/adjustments within constrained funding boundaries.
- Develop metrics to compare solution options against the AEF operational goals.
- Identify accompanying benefits, costs, and risk.

Within the guidelines from the CSAF, RAND, as analytic advisor in a study run by the Air Force, related process analysis to AEF operational goals as a framework for the review. The AEF operational goals, as outlined in previous research, are as follows:

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[1] For more details and a historical perspective of the organizational structure of maintenance in the Air Force, see Appendix G.

- Rapidly configure support.
- Quickly deploy both large and small tailored force packages with the capability to deliver substantial firepower anywhere in the world.
- Immediately employ these forces upon arrival.
- Smoothly shift from deployment to operational sustainment.
- Meet the demands of small-scale contingencies and peacekeeping commitments while maintaining readiness for potential contingencies outlined in defense guidance.[2]

CLR commenced in October 1999 with a process analysis that rendered suggested options for improving wing-level logistics processes (Phase 1) and concluded in March 2002 with completion of a field demonstration of approved process realignments (Phase 2).

The objective of the initial RAND process analysis was to develop a set of wing-level process improvement options that addressed current problems and to evaluate how those options impacted the effectiveness of implementing AEF operational goals. Efforts to identify process improvements were confined to the context of the current Objective Wing structure. The major commands (MAJCOMs) frequently suggested that sortie production and fleet health be realigned under a single authority, as in the old Deputy Commander for Maintenance (DCM) days, but this was not an option.[3] Thus, major reorganization options were not within the scope of this effort.[4] The process analysis phase (Phase 1) concluded with an array of improvement options for senior leadership to consider for implementation.

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[2] Tripp, Robert S. et al., *Supporting Expeditionary Aerospace Forces: A Concept for Evolving to the Agile Combat Support/Mobility System of the Future*, MR-1179-AF, RAND Corporation, Santa Monica, CA, 2000.

[3] General Ryan, CSAF during CLR Phase 1, was opposed to major organizational change or realignment. In his opinion, there had been enough major reorganizations within the Air Force, and he did not want to make any further significant changes.

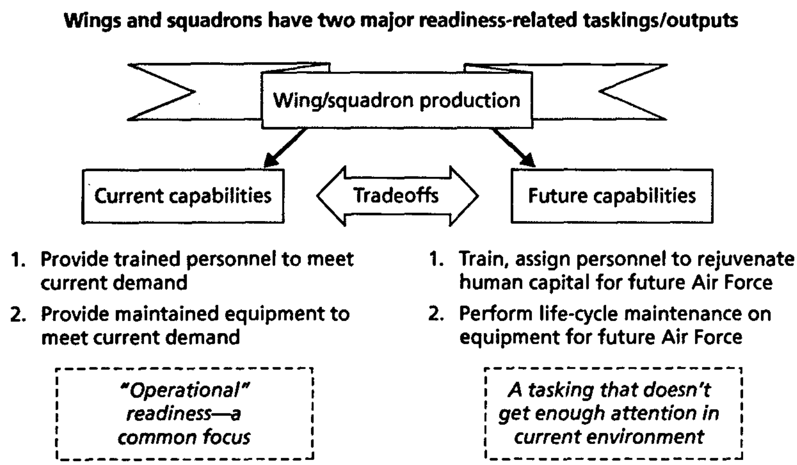
[4] Historically, the Air Force has oscillated between centralized and decentralized maintenance for as long as airplanes have been flying. For more details about the organizational structure of maintenance in the Air Force over the past century, see Appendix G.

The study initially focused on maintenance only. When RAND, as analytic advisor, suggested that the scope be broadened to include all logistics processes, the review was quickly expanded to include wing-level distribution and logistics planning processes as well. The lack of attention to the tradeoffs associated with balancing current sortie production goals and maintaining a prepared fleet for future engagements was a large contributing factor to CLR's initiation. Managing this balance is critical to the Air Force and central to any process alignment.

Figure 1.1 illustrates the challenges of balancing current and future capabilities. Dahlman and Thaler highlighted this balance in their report *Assessing Unit Readiness: Case Study of an Air Force Fighter Wing*, in which they describe the issue this way:

> The official DoD dictionary defines operational readiness as 'the capability of a unit/formation, ship, weapon system or equipment to perform the missions or functions for which it is organized or designed.' A distinguishing feature of the approach taken is that this concept is applied to both peacetime and wartime tasking.

Figure 1.1
Units Must Balance Current and Future Capabilities



RAND *MG190-1.1*

> On the most basic level, USAF wings and squadrons are designed to produce two overarching and intimately connected outputs related to readiness. The first is the ability to provide current military capabilities, i.e., the activities universally associated with operational readiness. If a wing had to go to war now, how well would its capabilities match up with the demands levied by the Combatant Commanders? Are the right numbers of personnel trained appropriately? Is equipment in good working condition with an adequate level of supplies? Can the requisite number of effective sorties be generated?
>
> The current production of future capabilities, while usually receiving less attention, is equally important. We emphasize these activities in this document precisely because they tend *not* to be emphasized in actual planning and programming. DoD and USAF guidance on and management of readiness traditionally emphasizes operational readiness and the requirements for maintaining this readiness are explicit. The production of future capabilities, through the rejuvenation of human capital by formal and on-the-job training (OJT), is not normally recognized as an equally important tasking. It is a capability assumed to be embedded in units but it often is not. As units are deployed to support contingency operations, they often postpone building future capabilities in order to provide current ones. The longer this continues, the more future commanders will be limited by having a less experienced, less capable force from which to draw.[5]

As many MAJCOMs pointed out in their CLR submissions, the issues of future fleet health and growing the human capital necessary to produce readiness in the future were not receiving enough attention. Therefore, in agreement with RAND advice, a good portion of the CLR effort addressed policies, training, and performance review initiatives to ensure that the Air Force gave this fundamental issue of readiness the necessary attention.

This report begins by presenting the methodology used to arrive at the improvement options, including the recommendations made

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[5] Dahlman, Carl, and David Thaler, *Assessing Unit Readiness: Case Study of an Air Force Fighter Wing*, DB-296-AF, RAND Corporation, Santa Monica, CA, 2000.

by participating MAJCOMs. The remainder of the report describes the design of the implementation test, the quantitative data findings, and the qualitative analysis results from interviews RAND conducted during the implementation test period. Also provided are conclusions and recommendations for use in formulating final implementation recommendations to the Chief of Staff and senior Air Force leaders. Eight appendices offer related, supplementary information.

CHAPTER TWO

CLR Phase 1: Analytic Approach and Results

With extensive MAJCOM and Air Staff participation, the RAND Corporation conducted an iterative analysis using wing-level, process-oriented problems and potential solutions identified primarily by the MAJCOMs. The effort became known as CLR Phase 1.

RAND's participation in CLR Phase 1 included assisting in the development of an analytic framework for implementing and testing CLR. RAND assisted in developing the following:

- Implementation plan framework
- Test plan framework
- Feedback mechanism structure
- Implementation plan integration/refinement
- Test plan integration/refinement.

The process RAND used for the analysis is detailed below.

Analytic Approach

CLR Phase 1 analysis used a structured methodology. The first step was to gather inputs from the MAJCOMs to the ten major processes published by the Air Force. The inputs identified common problems and solution options by targets of opportunity (ToOs). The next step was to establish the analytic framework, which was composed of the following three elements:

1. A mapping of MAJCOM problem and solution statements to the baseline wing-level logistics process.
2. Expanded solution options drawn from lessons learned from the Air War Over Serbia (AWOS) and other re-engineering efforts and studies.
3. A set of metrics against which to measure different solution options.

The third step was to establish baseline performance for the set of evaluation criteria. In establishing baseline performance, the current environment was evaluated against the analytic framework's metrics. After the baseline was analyzed, the next step, the fourth, was to present the baseline analysis and an initial set of solution options to the CSAF. This in-progress review was designed to solicit feedback and direction from the CSAF.

The fifth step was to analyze how the solution options would affect the baseline process. Each option was analyzed as an independent treatment against the baseline to determine its effects on the CLR analysis metrics. Included in this step was an analysis of how option packages would affect the metrics. The sixth, and final, step in the methodology was to present the analysis to Air Force senior leadership. The analysis was presented as a set of options and option packages that allowed senior leadership to make decisions based on the most-valued metrics.

Targets of Opportunity

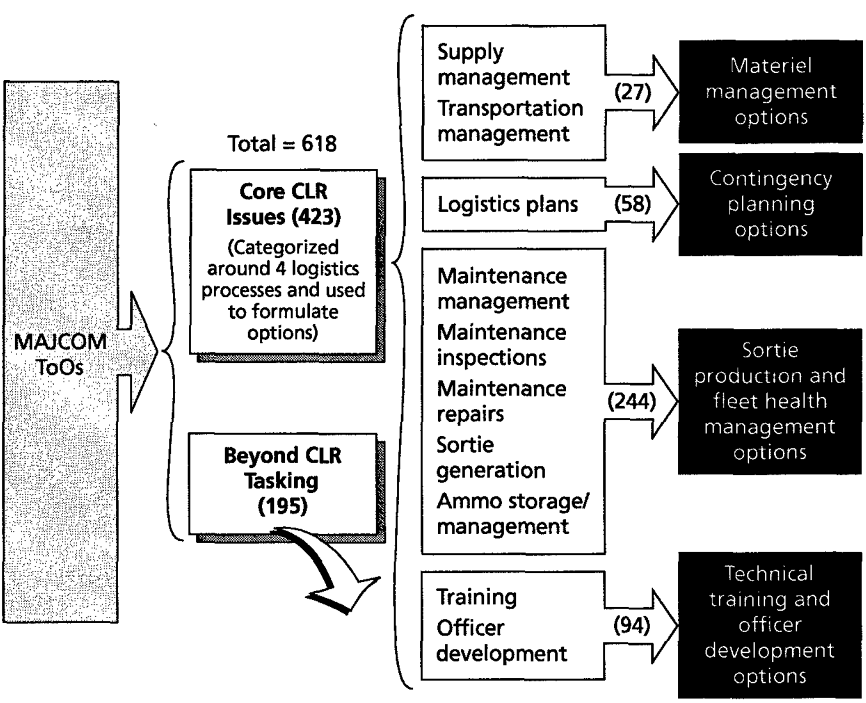
The first step in the methodology was to gather inputs from the MAJCOMs for the ten published major processes.[1] The MAJCOM inputs, called targets of opportunity (ToOs), identified common problems and solution options. The ToOs (see Appendix A for de-

[1] These processes are supply management, transportation management, logistics plans, maintenance management, maintenance inspections, maintenance repairs, sortie generation, ammunition storage and management, training, and officer development. See Figure 2.1.

tails) were categorized by Air Force logistics functional areas such as maintenance, munitions, supply, transportation, and logistics planning, as well as by the crosscutting area of officer development. In total, the MAJCOMs submitted 618 ToOs, each of which contained a summary statement of its focus followed by a set of task statements specific to the function.

After RAND consolidated and categorized the ToOs (610 ToOs became 423), they were returned to the MAJCOMs. The MAJCOMs were asked to respond with specific process problem statements related to each ToO area, the effect(s) of each process problem in that area, and solution options associated with each process problem. Figure 2.1 illustrates the structured methodology used in analyzing the solution options.

Figure 2.1
Methodology Used in CLR Phase 1



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MAJCOM inputs were solicited in two successive cycles. The first cycle yielded some insight on the challenges facing today's wing-level logistics processes, as well as multiple options for overcoming those challenges. However, specific process improvement options were not clearly defined. Individual commands used different approaches for compiling their inputs. Many went to their subordinate wings for inputs, and one command used a process that integrated process teams using a preexisting Integrated Definition (IDEF) model to present process descriptions and solution options when they matched ToOs. Across the board, however, there was a scarcity of existing process deficiencies and process revision recommendations. Many of the solution options addressed the problem but were not clear as to the process improvement expected from implementing the suggested solution.

The second cycle of MAJCOM submissions was designed to solicit more-specific process improvement recommendations and to encourage the MAJCOMs to focus on clarity and consensus. The commands achieved a measure of consensus on a set of solution options and commented on each other's submissions. Most notable, however, was the contrast in responses depending on organizational configuration. The Combat Air Force (CAF)[2]—Air Combat Command (ACC), USAFE, Pacific Air Forces (PACAF), and Air Education and Training Command (AETC)—focused on the declining fleet health attributed to the current alignment of aircraft maintenance functions under the Objective Wing. In contrast, Air Mobility Command (AMC), Air National Guard (ANG), Air Force Special Operations Command (AFSOC), and Air Force Space Command (AFSPC) all expressed satisfaction with the alignment of wing-level maintenance functions within their commands. The Objective Wing structure is different for the AMC, ANG, AFSOC, and AFSPC than it is for the CAF. For the commands satisfied with the alignment of wing-level maintenance functions, all maintenance functions fall under a single line of authority, the wing-level Logistics Group commander (LG/CC).

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[2] In other words, commands with tactical aircraft, whether used for combat or training.

Analysis of MAJCOM Inputs

In defining and evaluating potential solutions to the identified ToOs, MAJCOM problem and solution statements were mapped to baseline wing-level logistics processes. Additional solution options drawn from lessons learned from AWOS and other re-engineering efforts and studies were incorporated to establish a set of metrics. These metrics were the criteria against which different solution options were measured.

Some narrowing and repackaging of solution options occurred between the two cycles of MAJCOM inputs. Solution options were further refined during CLR review group meetings conducted at RAND, with MAJCOM representation, under Air Staff leadership. Even more repackaging came from analysis activities that the Deputy Chief of Staff, Installations and Logistics (AF/IL) study team performed internally with inputs from the General Officer Steering Group and members of the Grey Beard review team.[3] The inputs, by ToOs, were eventually grouped into the four process focus areas shown on the right in Figure 2.1: materiel management, contingency planning, sortie production and fleet health management, and technical training and officer development.

The problem statements and solution options for the largest process focus area, sortie production and fleet health management, covered activities associated with sortie generation (organizational-level maintenance), intermediate-level maintenance, and long-term health of the fleet. MAJCOM inputs associated with the following ToOs were mapped into the sortie production and fleet health management process focus area: maintenance management, maintenance inspections, maintenance repairs, sortie generation, and ammunition storage/management. Materiel management consisted of activities associated with ordering, shipping, and distributing resources within the wing. Thus, the supply management and transportation ToOs

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[3] AF/IL requested that several retired senior officers review the CLR initiatives and provide inputs and describe possible unforeseen consequences. See Appendix H for the list of senior officer participants.

were mapped into the materiel management process focus area. Contingency planning focused on the same activities but in relation to deployment planning and execution. The logistics planning ToOs provided the basis for problems and solution options within the contingency planning process focus area. Some MAJCOM problem statements and solution options from the training and officer development ToOs were specific to the other three process focus areas and some were crosscutting. All crosscutting issues were grouped within the technical training and officer development process focus area.

The process focus areas provided a foundation for analyzing solution options with respect to their current and future impact on AEF goals associated with readiness, speed of deployment and employment, and sustainment. There were, however, few good baseline data for current capabilities and few methods for relating the effect of the solution options to the AEF goals. Some historical data were available, but most MAJCOMs were unable to provide baseline data. Therefore, much of the option analysis was based on expert opinion rather than data.

Finally, the analysis was presented to Air Force senior leadership beginning with the Chief of Staff on July 7, 2000. The 423 core issues, categorized in four logistics processes, were refined into a final set of 23 proposed solutions. Some of the 423 issues were viewed as technical data; others could be implemented without review, approval, or test. The 23 remaining proposed solutions were presented as a set of options and option packages that allowed senior leadership to make decisions based on the metrics they saw as most valuable.

The CSAF-approved presentation was taken back to each MAJCOM commander. Then the options were returned, with MAJCOM feedback, to CSAF to obtain approval for a final set of options derived from the solution options. This final set of options was presented in early October at CORONA Fall,[4] where the CSAF approved 20 initiatives for implementation testing (CLR Phase 2)

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[4] CORONA is the name given to a meeting of senior Air Force general officers. The meeting occurs multiple times within a year, with each occurrence named differently (for example, CORONA South, CORONA Fall, CORONA Top).

and asked that three initiatives be revisited later, at CORONA South. In February 2001, at CORONA South, final approval was given to evaluate the CLR initiatives at test bases in order to make recommendations prior to Air Force–wide implementation. Table 2.1 shows the final solution options presented to CSAF and senior Air Force leadership.[5]

Testing of approved CLR initiatives, which became known as CLR Phase 2, was conducted at selected locations in the Continental United States (CONUS) and overseas from September 2001 through February 2002. For CLR Phase 2, the initiatives to be tested were limited to those expected to have a near-term effect on wing-level processes (in bold in Table 2.1). These initiatives were distinguished from initiatives either already being evaluated by the Air Staff or strategic enough in nature that they might require several years to implement. The Air Force continued to work other long-term initiatives not addressed in CLR Phase 2.

Classification of Improvements

The RAND analysis divided the solution options in Table 2.1 into three groups: near-term test, long-term evaluation, and continuous refinement. The near-term test initiatives would be implemented at test sites and evaluated at the conclusion of the test period (CLR Phase 2). Depending on the results, they then would or would not be implemented Air Force–wide. Initiatives requiring extensive time to implement (those more strategic in nature—for example, refining the

[5] Two of the technical training and officer development initiatives were consolidated, leaving a final list of 22 approved initiatives.

Table 2.1
Final Solution Options Considered by Air Force Leadership

Sortie Production and Fleet Health Management
Increase emphasis on sortie production and fleet health processes
Develop and enforce policy for *current* versus *future* readiness tradeoff analysis
Improve maintenance policy
Develop Senior Leaders Metrics Handbook
Improve enlisted maintenance training
Improve officer (logistics and rated) maintenance training
Pursue centralized intermediate repair facilities (CIRFs) for wartime and peacetime
Materiel Management
Develop guidance for materiel management pipeline analysis
Improve Regional Supply Squadron (RSS) policy
Develop training on RSS processes, tools, and metrics
Create single authority for distribution process
Pursue enhanced combat support execution planning and control (CSC2) at regional activities
Contingency Planning
Create and report metrics for contingency planning against AEF goals
Improve policy for deployments and site surveys
Create Joint Operations Planning and Execution System (JOPES) certification policy
Standardize logistics plans under LG
Technical Training and Officer Development
Increase the availability of training managers
Standardize nonrepetitive maintenance/deployment training tasks
Change Air Force recurring training timing to coincide with AEF cycles
Define logistics officer career paths into two tracks
Improve cross-flow management
Develop weapons school–type training for logistics officers

NOTE: Initiatives in bold were approved for testing.

logistics officer career path and forming a logistics officers' weapons school) would be considered under long-term evaluation. Initiatives in the continuous refinement group are efforts already under way or policy revisions accomplished routinely (such as the RSS, CIRFs, and revision of Air Force policy and doctrine). When these solutions were presented to Air Force senior leaders at CORONA South in February 2001, approval was given to evaluate process realignments at several test bases. The improvement options bolded in Table 2.1 were identified as initiatives that could be implemented immediately and evaluated during a six-month test or demonstration. Many of the options involved realigning responsibilities or integrating processes.

Sortie Production/Fleet Health Realignments[6]

Before CLR began, AMC, ANG, Air Force Reserve Command (AFRC), Air Force Materiel Command (AFMC), and AFSOC had realigned all maintenance under the LG commander. It therefore was not surprising that during CLR, they preferred not to change their current alignment of maintenance processes. However, the CAF MAJCOMs, whose maintenance was divided between the LG and the Operations Group (OG), favored adjustment. CAF's preference was to consolidate fleet management functions in a single flight in the Logistics Support Squadron (LSS). Within this flight would be Maintenance Data Systems Analysis (MDSA); Plans, Scheduling, and Documentation (PS&D); and Quality Assurance (QA). The belief was that combining these critical functions under a single manager, within the LG, would produce better fleet health management through the interplay of these functions during the operations and maintenance planning cycles. The MAJCOMs favoring this idea were also in favor of increasing policy and process guidance to strengthen the fleet health perspective with a more robust coordination process, particularly during the planning and scheduling cycle.

The main theme surrounding this realignment was recognition that fleet health concerns need to be balanced against sortie generation requirements. The belief was that the existing structure, which aligned maintenance under the OG, sacrificed fleet health to meet sortie generation requirements.

Finally, approval was given for a six-month test of a realignment in which phase docks, PS&D, MDSA, the Maintenance Operations

[6] The MAJCOMs recommended that sortie production and fleet management processes be realigned under a single authority. However, since General Ryan did not support major realignment, such as the creation of a separate maintenance group, this option was not considered during CLR.

Center (MOC), and QA would be under the LG. The phase docks would go under the Equipment Maintenance Squadron (EMS) and form a Maintenance Operations Division (MOD) with a Maintenance Operations Officer (MOO) to supervise all other functions except QA.

Materiel Management Realignments

The realignment combining current Supply Squadron and transportation functions into a new squadron was favorably evaluated by the MAJCOMs. The approved realignment, authorized as a CLR Phase 2 near-term test initiative, was to examine the integration of wing-level supply and transportation processes and alignment of those functions under a single squadron.

Contingency Planning Realignment

The second realignment recommendation relates to contingency planning and execution. The contingency planning activities, and, more specifically, the logistics planning function, were not standardized in the Air Force. Some commands had logistics planning in the LSS, some had it in the Wing Plans shop, and still others had some mix of these two arrangements.

The MAJCOM inputs indicated strong consensus for the need to standardize the alignment of logistics planning in the Air Force. Arguments for standardization centered on the current alignment's effect on officer development and deployment process execution. Two options for standardization were developed from MAJCOM inputs.

The first option was to align all logistics planning functions in the LG within the LSS. The other option was to integrate logistics planners into the newly formed Logistics Readiness Squadron (LRS), the name given to the organization represented by the merger of Supply and Transportation.

The approved implementation actions also included the development of a number of higher-level metrics, policy planning systems, and structures to improve expeditionary combat support practices and capabilities. However, only the alignment of logistics planners was subject to the outcome of the implementation demonstration (CLR Phase 2).

Other Approved Implementation Actions

Implementation actions for sortie production and fleet health management included rewriting Air Force Instructions (AFI) 21-101, Maintenance Management of Aircraft, to specify policy, procedures, training, discipline, and enforcement, and to define the OG and the LG responsibilities in accordance with MAJCOM alignments for maintenance. Specific metrics to drive balance between sortie production and long-term fleet health were established and a "how-to" book to guide senior maintenance decisionmaking was published. For example, guidance was provided for how to compare flying schedule effectiveness (FSE)—or how well the wing executes the planned flying operation—to time compliance technical order (TCTO) backlog—or how well the wing accomplishes upgrades to the fleet. If FSE is high (high is good in this case) and the TCTO backlog is low (low is good in this case), the indication is that the program may be balanced. However, if FSE is high (again, good) and the TCTO backlog is also high (not good), this could indicate that the program is out of balance. There is no single metric available that will accurately display the health of the fleet. The Air Force recognized the complexity of this issue when it published the senior leader guide.

Other approved implementation actions, not subject to the test or demonstration, included developing overarching command and control policy to support AEF goals, improving RSS policy while continuing to develop and refine policy to address RSS responsibilities in support of contingency operations, and developing tools, training, and metrics for RSS processes.

CHAPTER THREE

CLR Phase 2: Implementation Test Design and Analysis

Purpose and Initiatives of Near-Term Test

CORONA South (February 2001) brought CSAF approval for CLR Phase 2, implementation testing, to begin. The decision was to test the near-term test initiatives before implementing CLR Air Force–wide. The Air Force identified three primary purposes for the testing:

1. Validate the plan for Air Force–wide implementation of CLR.
2. Ensure there are no unintended consequences from implementing the initiatives.
3. Facilitate field-level buy-in of CLR initiatives through site interviews.

The near-term test initiatives primarily focused on process improvement and realignment of responsibilities for key processes. The test focused only on initiatives that directly impacted wing-level processes. All initiatives tested came from three areas: sortie production and long-term fleet health (SP/FH), materiel management (MM), and contingency planning (CP).

In the area of SP/FH, the CLR objective was to balance sortie production and fleet health by moving processes that affect fleet health under the LG and using metrics to ensure a balance between sortie production and fleet health. Specifically, personnel from the MOC, Phase, PS&D, MDSA, and QA moved under the LG. The wings evaluated the balance between sortie production and fleet health by evaluating specific metrics on a monthly basis. (See Appendix B for more information about the metrics used during the test.)

In the MM area, the combination of the Transportation Squadron and the Supply Squadron into a new Logistics Readiness Squadron (LRS) was tested. The objective in this case was to improve customer support, responsiveness, and reliability while reducing process cycle time. The wing focused on pipeline performance metrics to gauge the effect of streamlining the processes under one squadron. (See Appendix B for a list of the MM metrics.)

In CP, Logistics Plans was moved under the LG. One-half of the test sites placed Logistics Plans in the LSS; the other half placed it in the new LRS. In moving Logistics Plans, the hope was to enhance planning and the support of execution processes while finding out where the logistics planners best fit. (See Appendix B for a list of the CP metrics.)

Test Design

MAJCOMs were asked to suggest bases for CLR initiatives testing. Seventeen bases, representing operations in all MAJCOMs, were selected using criteria that considered a variety of operations, unique characteristics, base and squadron size, wing leadership support, and mission. Each base chosen implemented at least one of the three sets (SP/FH, MM, CP) of the CLR initiatives. Each base maintained the new configuration for a test period of six months, September 2001 through February 2002.

During the six-month period, the CLR initiatives were evaluated using both quantitative and qualitative measures. Test bases were provided a list of the metrics that RAND and the Air Staff had defined for measurement during the test. Metrics were gathered for all three test areas—SP/FH, MM, and CP. (See Appendix B for the complete list of metrics.) Where available, two years' worth of historical data were also collected for each metric. In addition, each MAJCOM calculated the fleet average (which included all bases in the command, not just the test bases) for each metric.

From September 2001 through March 2002, each test base submitted current data, historical data, and MAJCOM fleet averages to the Air Staff in monthly reports that were then forwarded to the Project AIR FORCE (PAF) team at RAND. These monthly reports also included narrative reports containing lessons learned or documented unintended consequences. The written reports highlighted areas of concern or areas needing further investigation. The quantitative and qualitative data in the monthly reports were the basis for the CLR evaluation.

In addition to the information supplied through the monthly reports, data were gathered during site visits to the test bases. PAF teams of two to four individuals visited each test base for short visits during January and February 2002. These visits were designed to gather necessary information while minimizing disruption to the wing caused by the visit. After a short in-brief with the wing's senior leadership (typically, the wing commander [CC] or vice commander [CV], OG/CC, LG/CC, deputy wing commander, plans [CVX], and wing inspections and evaluations [CVI]), the team conducted 30-minute structured interviews with base personnel involved in implementing the CLR test initiatives. The interview population reflected grade and functional area diversity, from wing commander to crew chief of the quarter, but was limited to those individuals affected by the changes implemented in support of the CLR initiatives. The data gathered and the results presented in the next several chapters are not intended to represent the entire Air Force, but only those Air Force personnel involved in processes that changed because of CLR initiatives. Appendix C contains the list of suggested interviewees that was provided to each test base.

The interviews were structured to maintain the integrity of the data collection process. After asking a series of baseline questions, each interviewer asked a set of questions about the initiatives being tested at the base. (See Appendix D for the question sets.) The questions focused on attitudinal acceptance of changes, perceived impact on process performance, and perceived impact on career development. Follow-up questions were asked to gather insights into areas needing further clarification as well as to promote open discussion of any other area the interviewee wanted to discuss. Quantitative (letter answers A through E) and qualitative (narrative responses) data were collected for each interview.

Analysis Methodology

RAND assisted the Air Force in developing a set of metrics to evaluate CLR implementation and provided analysis for an integrated set of solutions. This included

- Developing high-level metrics to evaluate integrated implementation.
- Developing a data-gathering plan and tools.
- Gathering and analyzing data.
- Reporting test results.

Both quantitative and qualitative data were examined. Observations resulted from the convergence of multiple data points from monthly reports, monthly metrics, and site-visit interview data. Monthly reports offered a "lessons learned" narrative perspective on test initiatives. Metrics reported monthly on process performance were viewed relative to historic performance as well as fleet averages. Data across bases were analyzed for common themes and trends. Site visits focused on the perception of change, which was compared to the actual change in metrics. In some areas, new metrics were developed to measure the improvements; in others, the improvement was more qualitative and interviews provided the most insight.

Determining a baseline against which to measure improvement proved to be the most challenging task. When the CLR test began, the intent was to use the quantitative data provided in the monthly reports to look for positive and negative trends—areas where improvements had been made and areas where there may have been some unintended consequences. With only a six-month test period, however, it was difficult to identify trends. The historical data were also to be used as a baseline, for comparing current and past trends.

Test bases would also be compared to fleet averages for the MAJCOM, again looking for positive and negative trends. The testing came at the same time the Air Force increased alert and readiness postures, and Operation Enduring Freedom and Operation Noble Eagle probably skewed some of the quantitative data. There is no completely accurate way to assess how these data were affected by the terrorist attacks on the United States on September 11, 2001.

The issue was further complicated by the difficulty of determining which interrelated actions impacted given improvements. For example, prior to CLR testing, many senior leaders had directed their subordinate commanders to pay closer attention to metrics. In 1999, then Lt Gen Robert H. Foglesong, 12th AF/CC, explained which metrics should be managed and clearly described the required level of wing attention he expected. The problem thus becomes one of determining whether a CLR improvement option alone or in combination with other factors—for example, increased funding of spares (a trend witnessed over the past year), a more predictable rotation schedule (AEF), or the operational tempo resulting from the September 11 attacks—impacted a given area.

There may also be several factors that prevented an initiative from realizing its full potential during the test period. Of these factors, resistance to change and the learning curve (the time it takes an individual to learn to accomplish his/her newly assigned taskings) probably had the greatest effect on new initiatives. We used qualitative data to identify any unforeseen barriers during the test phase. Through conversations with senior leaders and MAJCOM representatives, we attempted to understand whether any institutional barriers existed that might have prevented an expected improvement from being fully realized.

As previously stated, it may be impossible to pinpoint the impact of any particular change. For that reason, we identified metrics related to direct (low-level) effects that are influenced by single changes. We identified selected effects that could plausibly influence AEF-level metrics, and structured interviews to confirm that specific expected (and unexpected) cause-and-effect relationships between the CLR changes and the effects were in fact present. For example, placing the MOC under the Logistics Operations Flight commander was a move to ensure that the LG would be actively involved in day-to-day maintenance activities. One idea may be for the MOC to provide wing-level (centralized) priorities, while the management of the repair remains at unit level (decentralized execution). The intended effect would be a better balance between sortie production and fleet health by using wing-wide information. We would expect to see improved daily resource utilization. The thought that the improvement would in fact affect the larger AEF measure of merit will need to be analyzed before it can be proven. We used interview data in an attempt to determine whether the new MOC provided senior leaders with better information than the old MOC had provided; and, if so, if that better information actually led to a better balance between sortie production and fleet health.

Measuring expected improvements in daily resource utilization should be fairly straightforward. One indicator would be reductions in the amount of overtime that shared resource shops log. For example, if a sheet metal shop works all assigned aircraft in a wing, and clear priorities are not being established (that is, each flying squadron is establishing its own priorities), the shop may be working on repairs that are not required at a given time. Conversely, if changing responsibilities in the MOC helps to establish wing-level priorities, the shop could reduce the amount of overtime worked. Another indicator may be the amount of time a repair (part) waits for a maintainer to work it. These numbers, while known in an individual wing, are not reported to the MAJCOM.

Indirect measures where improvements are expected could include the following:

- **Flying schedule effectiveness.** Better use should result from the correct airframes being available for flight.
- **Scheduled maintenance effectiveness.** Wing prioritization for maintenance should increase the wing's ability to plan and achieve scheduled maintenance improvements. The phase time distribution interval (TDI) line should see some leveling of the workload if the phase plan realizes better execution.

During this analysis, the data were viewed from several perspectives that each gave a different insight into the quantitative data. However, the effects of September 11 were reflected in all of the quantitative data. Instead of clear trends of improvement or disruption of processes, mixed results were found, which is why more emphasis was placed on the qualitative data. Even though the data were tainted by September 11, the CLR initiatives clearly did not break any of the processes they were trying to improve.

The interviews consisted of both focused and open-ended questions, so the analyses include interviewees' judgments and opinions about process changes and the results of realignments. It is important to emphasize that data reporting and summaries for individual key result areas represent the interviewees' opinions and, where it existed, consensus. The recommendations and conclusions that were reached for this near-term test initiative are largely based on these same inputs.

The next two chapters present the observations and insights gathered during CLR Phase 2. Chapter Four focuses on sortie production and fleet health; Chapter Five focuses on materiel management and contingency planning.

CHAPTER FOUR

Sortie Production and Fleet Health

The objective of the primary sortie production and fleet health (SP/FH) initiative being tested was to improve the balance between daily sortie production and long-term fleet health priorities. For this test, fleet health functions were realigned, and related metrics were used to measure the success of the realignment. The test temporarily moved personnel and process management from the wing (MOC) and OG (Phase, PS&D, MDSA, and QA) to the LG. The OG retained control of daily sortie production, and squadron-level scheduling personnel remained in the flying squadrons under the OG, but the wing-level schedulers were assigned to the LG. In addition, a MOD was created under the LG to help facilitate the management of long-term fleet health.

The key result areas (KRAs) addressed in this chapter are as follows:

- Sortie production/fleet health balance (OG/LG coordination)
- MOC and resource coordination process
- Maintenance and flying scheduling
- Maintenance management (MDSA and QA)
- Maintenance corps career development (enlisted/officer).

It is important to note that interviewees were not reporting on the success or failure of a particular process change but, rather, on the difference in the quality or execution of the process under the realignment. Few processes were done differently; some were slightly improved, but most remained unchanged. Unanimity on this distinction is reflected throughout the comments of the interviewees, regardless of the ratings assigned.

Sortie Production/Fleet Health Balance (OG/LG Coordination)

This KRA focused on two subareas of investigation: (1) determining the realignments' overall effect on the balance between daily sortie production and long-term fleet health, or whether there had been any effect at all; (2) determining the realignments' effect on the coordination between the OG and LG.

Analysis Insights

At the beginning of the test period, the inputs were generally inconclusive because of the minimal length of experience with the realignments. Later, the insights from the monthly reports tended to correspond to responses gathered during field interviews. In many cases, the authors of the monthly reports were the individuals being interviewed during the site visit. In this particular KRA, the reports were often used to expound on sortie production and fleet health issues and contained both positive and negative opinions about the CLR realignments.

Quantitative measures (metrics) specifically listed in the test plan for this area were

- Utilization (UTE) rate
- Mission capable (MC) rate
- Flying schedule effectiveness (FSE)
- Maintenance scheduling effectiveness (MSE).

A review of reported data for the test period in these areas did not reveal any significant improvements during the test period or differences from baseline (historical) data. Unit activities associated with

September 11 may have skewed the FSE and UTE data and, in some cases, may have caused a temporary drop in MSE as well.

The CLR site visits revealed that significant improvements were not widely anticipated or experienced except in the case of improved coordination between the OG and LG commanders and personnel relative to performing certain maintenance processes. (The specific areas are addressed below, in connection with other KRAs—for example, MOC operation, and maintenance and flying scheduling.) When asked whether the realignment impacted the balance between sortie production and fleet health, the interviewees' perceptions were not uniform. It may be key here, however, to distinguish between *impacts* and *expectations*. Given how short the test was, few interviewees saw impacts from the test realignments. Nevertheless, many of them had high expectations as to future utility. One anomaly worth noting is that people's narrative comments often appeared to be more negative than their ratings, which overall tended to be favorable.[1]

The interviewees were asked, "Overall, are you favorable or unfavorable to the realignment of maintenance functions being tested in CLR?" Their responses were as shown in Table 4.1.

Table 4.1
Overall Acceptance of CLR Realignments

	Maintainers			
ALL—MAF/CAF[a] (198)	Total (167)	In OG (46)	In LG (121)	**Operators (31)**
Favorable	72%	48%	82%	58%
Unchanged	14%	24%	10%	29%
Unfavorable	13%	26%	8%	13%
Don't Know/No Opinion	0.6%	2%	0%	0%

NOTES: Appendix F provides more SP/FH quantitative data gathered during the site visits.
[a] Mobility Air Force/Combat Air Force.

[1] Letters A through E were used for the ratings. A and B responses are considered favorable; D and E responses are considered unfavorable. Interviewees were also given the option to answer, "Don't know, no opinion." See Appendix D for the question sets used during interviews. Detailed data on interviewee responses in the SP/FH KRAs are in Appendix F.

This was a general, nonspecific question about acceptance of the overall CLR SP/FH initiatives. According to the interviews, operators and maintainers in the OG preferred that the pre-CLR alignment be retained. Again, however, the narrative comments tended to be more against change than the actual scoring was: only 26 percent of maintainers in OG and 13 percent of operators in OG chose "unfavorable." It may be that this group saw CLR changes as acceptable but was concerned that CLR was only a prelude to further removal of maintenance from within the OG. Many maintainers under the LG (82 percent) and some maintainers from the OG (48 percent) who gave a "favorable" response stated that CLR should be the first step of a two-step process placing all maintenance under a single qualified maintainer. Some of the "unfavorable" ratings from logistics personnel were based on the feeling that CLR was not going far enough and would not solve the current process alignment problems. Others were concerned that if realignments were to go beyond CLR, a few of the old problems that the Objective Wing structure had successfully addressed might be recreated.

Summary Observations

Overall, the data gathered in the interviews support the idea of making the CLR changes permanent. The few comments made about CLR negatively affecting AEF responsibilities came from CAF operators and maintainers who want to train together and fight together, which to them means keeping sortie production responsibilities and personnel under the OG.[2] It was clear that most senior leaders and senior operations and maintenance personnel supported CLR and any related decision forthcoming. The "we can make anything work" ethic was evident.

It is clear that whatever steps are taken in the future, interviewees want to see policies and procedures that support continued emphasis on the tradeoffs between sortie production and fleet health. Many expressed the belief that sortie production and fleet health can-

[2] This opinion was expressed during CLR interviews in January and February 2002.

not ever be completely separated, that they are integral functions and as such need to be managed integrally rather than as separate processes identifiable to one group or the other.

MOC and Resource Coordination Process

MAJCOM inputs gathered during CLR Phase 1 indicated that the MOC organizational alignment (under the command post) prevented effective scheduling and coordination of maintenance activities. Other statements suggested that the MOC was not used to its fullest potential and that it was too far removed from the organization it supported. Solutions ranged widely. One solution aligned the MOC under one authority responsible for all maintenance activities, both back shop and flightline, and empowered the MOC to make decisions on resource allocation and priorities. Other solutions were for the MOC to not change from its current role of monitoring agency and for the control of maintenance to be left to the individual squadrons or to the group or organization with responsibility for flightline aircraft maintenance.

The decision was made to realign the MOC under the LG for the CLR test. The MOC was placed under the MOD, under direction of the MOO, with the recommendation that the MOO be a field grade officer. It was felt that with this function—along with PS&D, Engine Management, and MDSA—realigned into the MOD, the LG would have the resources necessary to influence fleet health management decisions. Additionally, it was thought that these personnel would receive better training and career opportunities.

Appendix B, paragraph 5, of the CLR Integrated Test Plan defines the MOC's specific responsibilities. According to the plan, the MOC is responsible for coordinating maintenance actions between organizations, including the use of shared resources. The MOC also coordinates requirements for personnel and equipment based on the daily flying and maintenance scheduling meeting. The MOC is also directed to ensure proper OG and LG involvement in schedule changes.

Analysis Insights

The success of the MOC realignment varied by unit. Some units reported that guidance was open to interpretation; that ramping up was slow because of the significant change in processes, activities, and education throughout the wing; and that physical relocation was not always possible. Other units reported that the transition was seamless and successful. Manpower, computer equipment, and space issues were also reported. As seen in Table 4.2, the question "How has the realignment of the MOC functions impacted the capability to control, coordinate, develop priorities, and allocate resources?" was asked in 171 interviews. Responses were either positive (41 percent) or that there was no evidence of change (50 percent). Insights from monthly reports and review of metrics data revealed no substantive evidence that MOC realignment had impacted fleet health metrics one way or another.

Summary Observations

A few of the MOCs visited were undergoing facility improvements. Construction and computer equipment costs possibly interfered with the desire of some LGs to centralize and manage a convenient and accessible center. In other units, the MOC had not moved out of the command post. In the MAF in particular, the desire was to keep the MOC located in the command post. Comments were received about an inadequate grade structure in most all MOCs. Also, being separate

Table 4.2
Impact of MOC Function Realignment on the Capability to Control, Coordinate, Develop Priorities, and Allocate Resources

	Maintainers			
ALL—MAF/CAF (171)	Total (155)	In OG (46)	In LG (109)	Operators (16)
Better	41%	17%	51%	6%
Unchanged	50%	72%	40%	75%
Worse	5%	7%	5%	6%
Don't Know/No Opinion	4%	4%	4%	13%

from the wing's Crisis Action Team prompted concerns. The debate over giving the MOC control authority over maintenance activities or maintaining it as a coordinating agency continues. Resolution of this debate is seen as central to the MOC's eventual effectiveness, regardless of organizational structure. Attention should be paid to identifying the specific responsibilities of the MOC as a shared resource, as well as resolving the location issue. If giving the MOC a "controlling" role is desirable, its controlling responsibilities and the authority to carry them out must be clearly understood across organizations. If the MOC is to remain as a monitoring and coordinating agency, then that capacity must be understood too. The MOCs role in relationship to all maintenance organizations and to key personnel needs clear definition.

Maintenance and Flying Scheduling

During CLR Phase 1, the most common problem cited was that of authority for maintenance being split between two groups, which often resulted in scheduled maintenance being sacrificed to fill the requirements of short-term operations. The MAJCOM inputs recommended going "back to basics" and centralizing PS&D under the organization responsible for fleet health. The consensus was that such a realignment would introduce better long-range planning to ensure AEF success while meeting day-to-day flying and maintenance goals. The consensus was also that this realignment would help fix the problem of not having the well-built flying and maintenance schedule needed to produce a balance of available aircraft and a well-maintained fleet. Concerns were also expressed about the daily flying schedule being too controlled by the OG, to the detriment of maintenance scheduling.

For the CLR test period, the primary initiatives to produce a better balance between sortie production and fleet health priorities concerned realignment of fleet health functions, including moving PS&D under the MOD and under the direction of the MOO, who reports to the LG. The OG retained control of the daily sortie production effort, and although wing-level schedulers were assigned to the MOD for the test, the squadron-level personnel remained in the flying squadrons. It should be noted that test guidelines called for performance evaluations to be routed through the PS&D section superintendent prior to closeout for quality review and to allow feedback to the rater(s).

This KRA focused on two subareas of investigation: (1) determining how the realignment of PS&D under the MOD and the creation of the MOD under the LG impacted maintenance scheduling; (2) determining how the same realignment under the MOD impacted the daily flying schedule.

Analysis Insights

Quantitative measures listed in the test plan for this area were FSE and MSE. The FSE/MSE data from the participating CAF unit's monthly reports provided no significant indicators of improvements or declines over the test period. In two instances, at different locations, it was reported that MSE declined and FSE rose significantly in conjunction with the events of September 11, but otherwise the data overall were "flat."

Certain test plan objectives could not be validated using the reported FSE/MSE data. Among these was "committing the fewest number of aircraft possible to meet programmed utilization (UTE) rate standards and goals." Likewise, a unit's ability to support quarterly flying-hour programs and maintenance requirements could not be totally validated from reported data. Therefore, we attempted to obtain comments during the interviews to validate both reported data and gain additional insights into scheduling effectiveness.

Interviewees were first asked, "How has the creation of the MOD under the LG impacted Maintenance Scheduling (FTD, Weapons Load, Phase, Wash, TCTOs, USM time)?" Table 4.3 shows the responses to this question. As shown, most interviewees (54 percent) agreed there had been little change.

Table 4.3
Impact of Realignment (MOD) on Maintenance Scheduling

	Maintainers			
ALL—MAF/CAF (170)	Total (157)	In OG (46)	In LG (111)	Operators (13)
Better	32%	15%	40%	23%
Unchanged	54%	72%	46%	61%
Worse	7%	11%	5%	8%
Don't Know/No Opinion	7%	2%	9%	8%

Interviewees were then asked, "How has the creation of the MOD under the LG impacted the Daily Flying Scheduling?" As indicated in Table 4.4, the majority of respondents (62 percent) did not believe there had been an impact.

Next, they were asked: "How has the realignment of Phase/ISO/PE impacted flow days, Time Distribution Interval (TDI), or Sortie Production/Fleet Health?" This question might have been addressed under the KRA dealing with balancing sortie production and fleet health, but we found responses more tied to maintenance and flying scheduling issues. Table 4.5 shows the responses, which in this case are only for the CAF, since only the CAF units were affected by the transfer of phase docks from the Sortie Support Flight in the FS to the EMS or Maintenance Squadron, thus placing them under

Table 4.4
Impact of Realignment (MOD) on Daily Flying Scheduling

	Maintainers			
ALL—MAF/CAF (168)	Total (154)	In OG (46)	In LG (108)	Operators (14)
Better	25%	17%	29%	14%
Unchanged	62%	76%	56%	79%
Worse	4%	4%	4%	0%
Don't Know/No Opinion	9%	2%	11%	7%

Table 4.5
Impact of Phase Inspection Realignment Under EMS

	Maintainers			
CAF (96)	Total (87)	In OG (29)	In LG (58)	Operators (9)
Better	42%	14%	57%	22%
Unchanged	30%	41%	24%	44%
Worse	21%	41%	10%	0%
Don't Know/No Opinion	7%	4%	9%	33%

the LG. Phase docks were already aligned under the LG in the MAF. As can be seen, 42 percent saw an improvement while 30 percent saw no change with the realignment of Phase.

The monthly reports and the quantitative reporting of TDI often indicated that the moving of the phase docks was having a favorable impact. TDI data, which improved in most cases, supported the favorable rating. Flow days were stable in some units and increased slightly in others. The interview results (Table 4.5) indicated a preference for the CLR realignment, mostly among the maintainers in LG (57 percent). They indicated improvements in flow days, TDI, and scheduling into Phase, and they identified multiple docks and the "Cann Docks" as process improvements. The number of "unchanged" responses was similar in each group, although LG maintainers often indicated that control over specialist support was still lacking. The maintenance personnel in OG either perceived no real improvements (41 percent) or were negative (41 percent), particularly because of the loss of control of personnel in Phase and the lost flexibility to use them for sortie generation when required.

Summary Observations

The quantitative data indicate slight improvements in metrics associated with the movement of Phase into EMS within the CAF, but no significant improvements or changes in reported MSE and FSE. In the case of FSE, that may be because there were no substantial or actual changes in processes at CLR test units associated with the preparation and execution of weekly/daily flying schedules. The interviewees often reported that the FS schedulers were doing what they always did: "building the flying schedule and plugging in jets." However, immediate needs often outweighed the longer-range implications. This was associated with statements about the lack of discipline with respect to Air Force Form 2407 (changes to the printed flying schedule).[3] For FSE, the flat nature of the data reporting corresponds with the noticeable interviewee consensus that things were "unchanged."

There was direction under CLR to "develop a methodology to review daily and planned flying and maintenance metrics identified to drive balance between sortie production and fleet health." Overall, interviewees indicated that some beneficial maintenance scheduling changes resulted from CLR.

As for MSE, it is likely that the CLR reporting period was not long enough to reflect the improvements discussed in interviews. This may also be the case for the realignment of PS&D under the MOD.

The CLR direction was to transfer the wing PS&D function to the MOD, where the PS&D section superintendent was to "perform as the functional manager for maintenance schedulers assigned to the PS&D and the flying squadrons." This permitted the FS maintenance schedulers to remain assigned to the FS, but routed their evaluations for review and feedback to the rater through the PS&D section superintendent. With the PS&D superintendent reassigned under the LG and taken out of the FS scheduling chain of command or line of authority, that position's impact on development and adherence to maintenance schedules may actually have been weakened.

This CLR realignment was attempting to centralize Phase scheduling and PS&D under the organization responsible for fleet health. When the MAJCOMs made their original inputs, they saw the need to build better schedules and to enforce discipline through unequivocal guidance on executing according to schedules to manage both the flying and maintenance programs. Inputs to CLR Phase 1

[3] Air Force Form 2407 is used to record changes to the printed flying schedule. The form is initiated and coordinated through the FS's and the OG. When there are few changes, it generally indicates good discipline or that changes are not being documented.

identified the need for better scheduling tools—for example, a maintenance capability tool equivalent to and capable of being integrated with the Ready Aircrew Program schedules. It is arguable but probable that flying requirements, apart from unexpected events such as September 11 and combat responses, are more easily quantified than the associated scheduled and unscheduled maintenance requirements. Accurately anticipating spares support, workforce requirements, capabilities, and shortfalls—that is, maintenance management—is less of a science and more of an art. However, it should be possible to develop a more capable automated tool to assist in this process. The Air Force should explore modeling solutions for such a tool.

Test inputs in response to the PS&D realignment expressed the need for better training in both the LG and OG on the scheduling process, as well as clear guidance and discipline on the process. The review of the FSE data for individual bases found no evidence of unintended consequences, yet the interview teams heard comments about excessive 2407 actions (changes to the printed flying schedule) or noncompliance with reporting such actions. Measurement of the wing's ability to plan and then measurement of the execution of that plan need to be reinvigorated.

The Air Force should evaluate the placement of all maintenance schedulers into one organization. The CLR test introduced a coordination and control problem by moving the lead wing scheduler to the MOD under the LG and leaving the squadron schedulers under the OG. Despite direction to route performance reports through the PS&D superintendent for quality review and feedback to the reporter, CLR introduced an unwanted situation in which one person had the responsibility for scheduling but not the authority needed to execute that responsibility. The original intent was to centralize scheduling authority in the organization responsible for fleet health, regardless of where that responsibility was eventually placed. The resulting process of working with operations schedulers would be unchanged.

Maintenance Management (MDSA and QA)

CAF inputs to CLR Phase 1 identified a lack of use of MDSA and QA functions for providing the products or evaluations needed to focus management's attention on the tradeoffs associated with balancing current sortie production goals and maintaining a prepared fleet for future engagement. The most common MDSA problems cited by the MAJCOMs were lack of both predictive capabilities and deficiency analyses illustrating potential fleet health problems or trends. In QA, the ToOs resulted from suggestions such as looking at QA requirements and techniques, enforcing technical order usage, enforcing maintenance documentation, and achieving greater maintenance standardization.

For the CLR test period, MDSA and QA management moved from the OG to the LG. The wing's QA function was consolidated as a staff element under the LG/CC, and the MDSA function transferred from the Operations Support Squadron (OSS) to the MOD, under direction of the MOO.

This KRA focused on two investigation subareas: (1) determining how the realignment of MDSA under the LG impacted the use of analysis products, with emphasis on analysis use in managing and scheduling; (2) determining how the QA realignments improved QA capabilities and contributed to enhanced sortie production/fleet health.

Analysis Insights

The insights from monthly reports were similar to the narrative data obtained during field interviews in both subareas. In this particular KRA, the reports indicated some improved use of analysis in making fleet health requirement determinations.

Quantitative measures specifically for this KRA (MDSA and QA) were not developed in the test plan. Units reported periodic inspection Quality Verification Inspection (QVI) pass rates and QA pass rates by programmed aircraft authorization/mission design series, but too little consistent trending, incomplete data, and too much variance between and within units precluded using the data to make any inferences about QA's effectiveness or the impact on balancing sortie production and fleet health.

The situation is similar for MDSA. There were no specific quantitative measures given in the test plan to measure the function's effectiveness, although the plan did set forth major roles and responsibilities. We relied on the narratives in the monthly reports and the interview data to determine whether these responsibilities were being met and what the impacts were. Table 4.6 presents the results of asking, "How has the realignment of Analysis functions impacted the use of analysis in managing and scheduling?" Most interviewees said there had been no change (53 percent), especially those in the OG (73 percent).

For QA and the effects of this realignment/consolidation under the LG, we asked interviewees, "How has the realignment of QA enhanced sortie production and/or fleet health?" Table 4.7 shows the perceived effects of realigning QA under the LG.

As with MDSA realignment, most interviewees did not see a change. The impact of the realignment of MDSA and QA on the MAF was negligible. Table 4.8 shows the CAF responses pertinent to this analysis.

Table 4.6
Use of MDSA in Managing and Scheduling

	Maintainers			
ALL—MAF/CAF (142)	Total (130)	In OG (41)	In LG (89)	**Operators (12)**
Better	32%	10%	43%	33%
Unchanged	53%	73%	44%	42%
Worse	6%	7%	5%	17%
Don't Know/No Opinion	9%	10%	8%	8%

Table 4.7
Impact of QA Realignment on SP/FH

ALL—MAF/CAF (128)	Maintainers Total (116)	In OG (38)	In LG (78)	Operators (12)
Better	22%	21%	23%	0%
Unchanged	66%	73%	63%	67%
Worse	2%	3%	1%	8%
Don't Know/No Opinion	10%	3%	13%	25%

Table 4.8
Impact of QA Realignment on SP/FH, CAF Only

CAF (114)	Maintainers Total (104)	In OG (36)	In LG (68)	Operators (10)
Better	23%	22%	24%	0%
Unchanged	65%	72%	62%	70%
Worse	2%	3%	1%	10%
Don't Know/No Opinion	10%	3%	13%	20%

Among interviewees responding favorably, there was much support for QA being under the LG. Interviewees felt the LG was the preferred single manager and that this was the correct place and method to accomplish an increased QA focus on fleet health. Moreover, QA was being better managed under the LG, and there was additional support for having the QA personnel together. Most agreed that QA needed better standards and that attention should be given to selecting good QA personnel. Very few, if any, respondents attributed better-enhanced fleet health to this realignment.

Summary Observations

Based on the interviews, leadership and maintainers showed slightly more support for retaining MDSA either in LG or under a lead maintainer than it did for doing the same with QA functions.

There was support for consolidating QA, wherever it was placed in the wing, and for having a single QA manager. Most often, the LG was named as the best choice. Personnel expressed some concern about QA losing its ability to "tell it like it is" in every area, particularly those areas under the LG. Based on the interview data, CLR changes produced more significant improvements in MDSA and analysis products than they did in QA.

Interviewees indicated a strong preference to have QA assigned directly under the LG (as a staff function) rather than in the MOD or under the MOO if it is to remain assigned under the LG. There is a compelling argument for having QA under the organization responsible for all maintenance, as in the MAF, ANG, AFRC, and AFSOC. The only place in the CAF today that all maintenance comes together is at the wing commander's staff. But CAF interviewees, particularly the LG maintainers, favored having the LG or senior maintainer head this QA function, particularly if the LG is to retain responsibility for fleet health.

An argument that should be considered prior to a final decision on where QA will be permanently placed is that group commanders are responsible for ensuring that their organizations assess maintenance quality per AFI 21-101. If sortie production and fleet health remain split between two groups, the use of QA as a catalyst for improvement may dictate that each commander retain equal authority or control over QA, or even that QA move to the wing to ensure compliance between both groups.

As reported in the KRA details, having MDSA under the MOD and under the direction of both an experienced MOO and the LG/CC is widely accepted. This alignment can be used to guide MDSA execution of both deficiency and predictive analyses according to established guidelines and LG policies. Should the LG retain fleet health–focused responsibilities, the wing is best served with MDSA realignment in the MOD under the MOO.

Maintenance Corps Career Development (Enlisted/Officer)

Enlisted experience and training and officer development were both expressed as major concerns by the MAJCOMs. During CLR Phase 1, the solution recommended by the MAJCOMs focused on centralizing maintenance training management for the wing under the LG. The CSAF gave approval for exploring what changes were necessary to improve enlisted training. The CSAF further directed that officer development be focused on establishing the level of training required by maintenance officers at various stages in their careers and levels required to assume specialized positions in the AEF. It was recognized that current officer career development and specialized technical or maintenance management training might not be as strong as they need to be to support the AEF. MAJCOMs saw the need to develop officers with significant depth in maintenance management, especially better technical knowledge on how to generate, launch, and recover aircraft while ensuring long-term fleet health and maximizing sortie production.

Analysis Insights

Few discussions on enlisted/officer career development were forwarded in the CLR monthly reports, but the relationship between the MOO and the Deputy for Operations Group Maintenance (DOGM) captured the attention of most officers during base interviews. Many commented that the MOO was the LG equivalent of the DOGM and yet possessed less rank and authority than the DOGM and was often perceived to be subservient to the DOGM. Some also stated that the DOGM position was not promotable and was thus a "dead end."

The CLR site visits revealed fairly consistent responses to the questions on how the CLR initiatives affected officer/enlisted development.

Interviewees were first asked, "How will the realignment of functions under the LG impact enlisted training for the affected functions?" Table 4.9 shows both the CAF and the MAF responses.

Table 4.9
Impact of Realignments on Enlisted Training

	Maintainers			
ALL—MAF/CAF (166)	Total (153)	In OG (46)	In LG (107)	Operators (13)
Better	41%	35%	43%	15%
Unchanged	47%	54%	44%	54%
Worse	7%	7%	7%	8%
Don't Know/No Opinion	5%	4%	6%	23%

Interviewees were next asked, "How will the realignment of functions under the LG impact maintenance officer development?" Table 4.10 reflects the responses to this question, this time broken out further to show both enlisted and officer interviewees' responses.

The responses were heavily in favor of officer mentoring improvements attributed to the broader involvement of the LG in training (56 percent of enlisted personnel and 63 percent of officers said "better"). Even in the CAF, where the maintainers in the OG were evenly balanced between "better" and "unchanged," the officer responses in particular favored this change. Their "unchanged" responses were positive overall to the increased emphasis on LG mentorship for all maintenance officers, regardless of where they were assigned in the unit.

Summary Observations

The impacts of CLR on enlisted training have been minimal. Most comments were positive, and it was evident that most enlisted personnel were comfortable with the training process changes that resulted from the realignment. This was particularly true with the MOC and Phase. Noncommissioned officers (NCOs) assigned to the MOC during CLR found training opportunities in their primary Air Force Specialty Code (AFSC) better than those available when they had been assigned to the Command Post. Some units expressed their intent to rotate these NCOs back into their maintenance duties to

Table 4.10
Impact of Realignments on Officer Development

	Maintainers							
	Total (152)		In OG (46)		In LG (106)		**Operators (13)**	
ALL—MAF/CAF (165)	Enlisted (106)	Officer (46)	Enlisted (33)	Officer (13)	Enlisted (73)	Officer (33)	Enlisted (0)	Officer (13)
Better	56%	63%	36%	46%	64%	70%	0%	46%
Unchanged	26%	30%	36%	54%	22%	21%	0%	23%
Worse	7%	7%	15%	0%	3%	9%	0%	23%
Don't Know/No Opinion	11%	0%	12%	0%	11%	0%	0%	8%

gain the needed experience and functional expertise. In some units, the consolidation of phase docks produced new training on the new or improved processes.

The impact of CLR on maintenance officer career development was also positive. Increasingly, the LG had the primary role in mentoring and career development for all maintenance officers.

There are shortfalls between the desired grades for slots and the available officer personnel in those grades who have sufficient experience. For example, the general consensus was that at least a field grade officer is needed for the MOO's position. At present, some people occupying these slots are captains, who, while doing an excellent job (as rated by their peers and superiors), nonetheless admitted to needing either more rank or more experience to fulfill the MOO's real duties. The establishment of the MOD and the MOO presents an excellent additional training and career opportunity for maintenance officers. However, if the MOO is the DOGM-equivalent position in the LG but is actually subservient to the DOGM because of a grade difference, desirable high performers might not enthusiastically seek out the MOO position.

In the CAF, responses favored parity in grade between the DOGM and the MOO. However, DOGM responsibilities currently require a more senior 0–5 position; an equivalent rank in the MOD is unnecessary. In the AFRC, it was stated that the MOO should be an Active Reserve Technician position to ensure continuity with daily operations. DOGM and MOO working relationships and responsibilities, with respect to shared resources, need to be better defined.

Sortie Production and Fleet Health Recommendations and Conclusions

The on-site interviews, monthly reports, and quantitative data (metrics) did not clearly indicate any significant improvements in sortie production or fleet health attributable to CLR realignment of processes. However, interviewees often noted that the increased focus on fleet health issues because of the CLR test was a definite success story.

Many expect this stronger focus to have a favorable longer-range impact on the overall process as well as on improved fleet health metrics. Interviewees viewed CLR as a success because the senior logistician on base re-engaged in scheduling and resource utilization associated with maintenance. The movement of Phase to EMS and creation of the MOD (including PS&D and MDSA), directed by a seasoned maintenance officer whose focus is long-range fleet health, are also viewed as an improvement, even in MAJCOMs operating pre-CLR in an Objective Wing structure with all maintenance aligned in the LG. While quantitative metrics did not reflect these process improvements, the interviews revealed a perception that they had occurred. Looking beyond the responses related to parochial organizational gains or losses and perceived correction of long-standing misalignment, interviews exposed success at a more basic level, re-emphasizing a back-to-fundamentals approach to maintenance management.

Now that CLR testing has ended and the data have been analyzed, the original hypothesis made by senior Air Force maintainers still holds: "Once this fundamental issue (of what it takes to achieve balance) is understood and mechanisms are put in place to achieve that balance, any form of support organization can be made to work, although some may be more efficient than others, and some may be more effective than others."[4]

Testing of the CLR initiatives served to clarify actions needed to successfully achieve and maintain the balance. Those actions are centered on basic management principles associated with

- Metrics
- Policy
- Policy enforcement.

Improvements in these areas have already been experienced; further attention is required, however. To that end, the following recommendations are offered.

[4] Gabreski, Brig Gen Terry L., *Chief of Staff, United States Air Force Logistics Review*, Headquarters AF/ILM, Washington D.C., June 2000.

Continue to encourage and facilitate the use of metrics to balance daily sortie production and long-term fleet health management at the wing level. Across the board, increased attention to metrics was evident; wing commanders were regularly chairing metrics review meetings. However, personnel raised questions about the value of some existing measures in terms of managing the balance between sortie production and long-term fleet health. Questions were also raised about resource utilization in order to achieve that balance, suggesting there may be a better way to measure the efficiency with which a wing meets sortie production and long-term fleet health requirements. Instead of focusing on MC rates, a better approach might be to focus on the scheduling process—maintaining a balance between daily sortie production (near-term readiness) and future fleet health (long-term readiness).

It is in scheduling that the tradeoffs are made between putting aircraft on the schedule to meet daily flying requirements and reserving aircraft to schedule any number of maintenance events (for example, phase maintenance, maintenance training, or time-change item replacement) typically associated with maintaining long-term fleet health. The core issue in this area is twofold. One must build a solid schedule that best satisfies both operational and maintenance requirements. And, equally importantly, one must be able to measure how successfully the wing executes the planned schedule. The Air Force should examine how deviations to the flying and maintenance schedule are reported.

Consider implementing additional maintenance and maintenance management policy improvements, additional job performance aids, and further refine training and education opportunities. Concurrent with the CLR test, AFI 21-101 was updated to incorporate more specific and detailed guidance for executing aircraft maintenance. Test base personnel welcomed the updated AFI and identified specific areas where additional clarification is needed:

- Better delineation of roles and responsibilities for the MOO and DOGM.

- Better definition of the MOC's roles and responsibilities relative to coordinating and/or controlling the use of maintenance resources.
- Better training in status reporting for MOC personnel and others.

Consider implementing additional activities to monitor, measure, and evaluate policy enforcement. There was widespread belief that moving away from compliance inspections concurrent with transitioning from Air Force Regulations (AFRs) to the less-detail-oriented AFIs was detrimental to process management and execution. Feedback with respect to flying and maintenance scheduling processes offered insight into this issue.

Interviewees commonly coupled the scheduling process with a lack of compliance and policy enforcement, describing a lack of rigor and discipline associated with making changes to the schedule and accounting for changes in metric reporting. Quite often, personnel sought ways to accomplish schedule changes in ways that would not require reporting to the MAJCOM. More-senior interviewees noted that this was a variation from the days when appropriate actions were taken based on the spirit of the regulation, even if the regulation did not specifically dictate the action. This example, and others, supported the desire for increased policy enforcement and compliance inspections.

Proceed with Air Force–wide implementation of CLR sortie production/fleet health initiatives, and consider alternatives to further enhance maintenance process execution. Managing the balance requires specific guidelines and policies, as well as strict enforcement of those guidelines and policies accompanied with valid metrics to measure whether performance meets standards. There is a widely stated need for better guidance and clear delineation of roles and responsibilities among key organizations and their subfunctions, regardless of organizational alignment. While CLR realignments proved effective at increasing the focus on foundation issues associated with policy, enforcement, and management tools, there is value in addressing changes that will still realize the benefits of improvements in management principles while addressing resource and operational issues relevant to the current environment.

Spare parts availability, while improving, still drives what many consider to be excessive cannibalization (CANN) actions. Several of the test bases have implemented wing-level CANN docks to consolidate holes.

Finally, the move by the Air Force from the Objective Wing to the Combat Wing organization can only be seen as a positive step forward. The new wing structure should address many of the secondary issues brought up by field-level maintainers during the CLR process. However, there are concerns related to this reorganization that need to be addressed.

The first of these concerns arises from the contention that an alignment of maintenance with operations is more effectively enabled during deployments or in combat, because the two train at home the way they deploy ("fight")—that is, with the same group of people identifiable to that deployment or combat organization. This is normally the flying squadron or a subset of the squadron.

Under a centralized maintenance structure, there is an implied overhead that must accompany any size force during deployments to operate as trained. This overhead was reduced somewhat in the early 1990s when maintenance personnel were reassigned directly to the flying squadrons, where they would train with the same people and stay in the same command structure in peacetime and during deployments/combat. There are advantages to this type of cohesive training and deploying, advantages that must be weighed against those offered through central management of critical resources.

What is often overlooked in relation to this issue is that what maintainers do in combat is essentially the same thing they do in peacetime, regardless of organization or location. It is individual training that is most critical to maintenance execution under combat conditions. A single operating mode to maintain the healthiest fleet possible and rejuvenate human capital in peacetime is achievable through greater centralization of maintenance resources and more-focused management of all associated processes. Future operational concepts might force reconsideration of the tradeoffs between centralized resource management and the deployment/combat effectiveness of a decentralized alignment.

Another concern is the control issue, which is undoubtedly reflected more in the challenge of creating and adhering to a daily or weekly flying schedule. There are some who believe they have the authority to deviate from schedules, ignoring regulations. This issue may be minor, but it drives an apparent tendency for a two-sided scheduling operation in which one side feels it has a stronger basis for making changes or for reprioritizing outside the scheduling contract or as directed by higher headquarters. To the extent that this issue detracts from a unified scheduling process that reflects a single system and its priorities in attempting to balance daily sortie production and long-term fleet health, it is a misperception that leadership should eliminate.

Finally, CLR maintenance initiatives focused on creating a balance between daily sortie production and long-term fleet health. The initiatives served to re-engage senior logisticians in aircraft maintenance and energize a renewed focus on long-term fleet health. While successful in these terms, the initiatives' long-term value is a renewed focus on core process management principles associated with detailed policy, policy enforcement, job performance aids, and training and education. Additional initiatives aimed at improving these fundamental enablers will likely ensure continued maintenance support of operational requirements, regardless of the wing-level alignment of maintenance functions.

CHAPTER FIVE

Materiel Management and Contingency Planning

This chapter discusses the KRAs that were derived from the CLR initiatives to integrate supply and transportation functions and to determine an Air Force standard for the alignment of logistics planners at the wing level.

The CLR concept of operations defined materiel management (MM) as "the supply and transportation functions inherent to the receiving, shipping, movement, storage, and control of property." By defining MM as a series of key processes and functions, the long-standing division between traditional base supply squadrons and base transportation squadrons is addressed.

The CLR Integrated Test Plan directed a fundamental base-level reorganization to test the hypothesis that a more integrated organizational structure, logically derived from combining the supply and transportation MM functions stated above, would lead to a more integrated MM process followed by significant process improvements. As a result, existing base supply and transportation squadrons at seven CLR test sites were merged to form what was called a Logistics Readiness Squadron (LRS).

Air Force senior leaders also decided to test the alignment of logistics planners within the LG and to evaluate alternative alignments within the group. Subsequently, the CLR test outlined the test alignment and identified units that would align in either the LSS or the newly formed LRS being tested in CLR.

The KRAs for the MM and CP initiatives were as follows:

- Distribution process performance
- LRS operations
- Supply/Transportation enlisted career development
- Deployment planning and execution
- Logistics officer and Logistics Plans enlisted and civilian career development.

Distribution Process Performance

The CLR test plan isolated a specific process, distribution, for test and evaluation. However, as Table 5.1 shows, standard Air Force wing metrics on MM performance track only a "base pipeline process," which further breaks down into a series of activities split between base transportation and base supply functions.

From inception, this KRA was based on the hypothesis that a necessary first step toward process improvement was to integrate transportation and supply and to create a single process manager for distribution. The logical way to do this was to merge the supply and transportation functional areas involved in the total process shown above. The CLR initiatives, however, pressed the supply-transportation merger all the way to the squadron level and directed

Table 5.1
Materiel Management CLR Metrics

Supply processing time (Supply)
Supply hold time (Supply)
Trans processing/cargo hold time
Trans processing/cargo hold time (999 cargo)
Receiving to storage or issue (Supply)
Receiving to pickup and delivery (Supply)
Pickup and delivery to customer receipt (Supply)
Average repair cycle days (DIFM) (Supply)

seven test bases to merge existing supply and transportation squadrons into the new LRS. The issue of streamlining the distribution process was then revisited as a subset of the greater LRS reorganization.

Supply and transportation inbound/outbound and MM functions were combined into a Distribution Flight with the mission to "be the single wing authority for receiving, storing, and shipping DoD supplies and equipment."[1] The Distribution Flight was further subdivided into two elements: cargo movement and MM. The cargo movement section, in particular, reflected yet another level of integration as its inbound freight section (a former transportation function) took over the former supply receiving function.

It was thought that the disruption caused by the LRS reorganization might make near-term distribution process improvements difficult to isolate. Therefore, evaluators hypothesized that implementation without unintended negative consequences could be seen as a measure of success.

Analysis Insights

During site visits, wing/group leaders and squadron personnel were asked, "How has the merger (of supply and transportation squadrons into a single Logistics Readiness Squadron) impacted the base level distribution process performance?" The results are shown in Table 5.2.

Table 5.2
Impact of Merger on the Base Level Distribution Process

ALL—MAF/CAF (91)	Supply (49)	Trans (24)	Other (18)	Total (91)
Better	33%	4%	28%	24%
Unchanged	49%	63%	55%	54%
Worse	8%	8%	0%	7%
Don't Know/No Opinion	10%	25%	17%	15%

[1] U.S. Air Force, *CLR Integrated Test Plan, Annex C, Supply and Transportation Squadron Merger,* July 2, 2001, page C-13.

As can be seen, 24 percent of the interviewees saw the merger of supply and transportation as having a positive impact on the base-level distribution process, about 7 percent saw it as having a negative impact, and 69 percent either saw it as having no effect or had no opinion.

The merger's effect on the distribution process may have been difficult to capture in this near-term survey, however. The CLR test continued to use old metrics to measure new organizations, and the CLR site survey did not direct its questions to base-level customers. When the answers were broken out by the interviewees' functional categories, they revealed differences in perceptions between supply personnel and transporters.

One-third of the supply interviewees believed that the LRS merger had improved the distribution process, whereas only about 4 percent (1/24th) of the transporters saw positive change. In part, this outcome may be a reflection of the dominant transportation view voiced during nearly all of the site interviews: The CLR-mandated LRS merger was "a hostile takeover of Transportation by Supply." Test evaluators noted that supply personnel did, in fact, outnumber transportation personnel in the new LRS, and they tended to dominate the leadership positions.

Another view of these data can be found by comparing the results for the question above, which asks interviewees to evaluate how the merger has impacted the *distribution process,* with a subsequent question that asks how the LRS restructuring has impacted *operations in the Distribution Flight.* As discussed above, the Distribution Flight was formed by combining cargo movement functions (both Transportation and Supply had inbound/outbound sections) and Supply's MM functions into a single entity designed to have total ownership of the base MM/distribution process. Table 5.3 shows the results from the second question: "How has the restructuring impacted operations in the LRS Distribution Flight?"

As can be seen, 55 percent of the supply personnel interviewed rated Distribution Flight operations as "better" under the new flight and squadron structure. In contrast, only 33 percent of the same

Table 5.3
Impact of Restructuring Operations in the LRS Distribution Flight

ALL—MAF/CAF (78)	Supply (49)	Trans (24)	Other (5)	Total (78)
Better	55%	21%	40%	44%
Unchanged	16%	16%	40%	18%
Worse	21%	21%	0%	19%
Don't Know/No Opinion	8%	42%	20%	19%

functional group saw improvements to the distribution process (see Table 5.2). And the transporters showed an even greater discrepancy than the supply personnel. While only 4 percent of the transporters thought the merger had improved the distribution process, 21 percent rated distribution operations as "better" after the merger.

Comparing the supply and transportation responses to both questions shows the degree to which the perceptions of the supply personnel were positive and the views of the transporters were negative. The interviewees' comments shed additional light on reasons for the supply-transportation split in the two distribution questions; these are addressed below, in the Summary Observations section of this analysis.

Another reason that process improvements may have been transparent to most interviewees is that the base-level distribution process is only a small segment of the much greater AEF/theater/global distribution process.[2] In contrast with global and theater distribution process improvement efforts (such as the Strategic Distribution Management Initiative, or SDMI), which deal with international and intermodal movements that span days, weeks, and months, base-level distribution has a small range of activity—moving the resource from its base entry point to the base-level customer.

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[2] JP 4-09, *Joint Doctrine for Global Distribution,* defines *global distribution* as the "process that synchronizes and integrates fulfillment of joint force requirements with employment of the joint force. It provides natural resources (personnel and materiel) to support the execution of joint operations. The ultimate objective of this process is the effective and efficient accomplishment of the joint force mission." In addition, it defines *global distribution of materiel* as "the process of providing materiel from the source of supply to its point of consumption or use on a worldwide basis."

As the data in Table 5.3 indicate, tangible and measurable distribution process improvements may also be transparent to the customer, because, in fact, only minimal gains in time are possible when measured from the point of entry/exit from the base to/from the hands of the base customer.[3] The normal process is often complete in a matter of hours or minutes, not days. Most distribution delays (and the focus of most strategic, CONUS, and theater distribution process improvement efforts) are beyond wing control.

From this perspective, distribution process improvements at base/wing level are gained primarily by organizational and operational efficiencies, reducing the number of internal organizations that must handle a single part on its way to the customer. When the separate supply and transportation distribution functions were merged into a single organization, the Distribution Flight, interviewees could readily see a "one-stop shop" for distribution.

Summary Observations

Interviewees' perceptions of the near-term impact of this CLR-directed reorganization around a single process ought to be seen as a general and positive validation of distribution as a core Air Force logistics process. The combination of the formerly separate supply and transportation functions related to the distribution process was rational and logical to the majority of participants at the CLR test sites. Interviewees appeared to understand and support the CLR intent of using the distribution process as a template for a new organization, the Distribution Flight, to be the single process owner. As a result, organizing the Distribution Flight around a core process made sense to almost everyone. On the other hand, interviewees did voice general frustration that the new, improved distribution process could not be tracked in any meaningful way by the current wing-level "materiel management/base pipeline" metrics.

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[3] *Customer wait time (CWT)* is the standard measure of distribution process performance and is defined in JP 4-09 as "the total elapsed time between issuance of a customer order and satisfaction of that order."

The gap between perceptions of improvements to distribution *operations* and perceptions of improvements to the distribution *process* is not surprising and does not seem significant. The base-level distribution process realizes most of its efficiencies from improvements to the services provided to the customer, a function of a streamlined organization versus actual improvement to CWT. Improved CWT could be gained from reductions in the handling or transit time within each segment of the overall process. Improvements to operations (which are really improvements to customer service) will likely have some effect on the process, but most improvements will be judged by those benefiting from the improved customer service. Customers may wait the same amount of time for their parts, but process execution will be much less difficult.

The supply-transportation split bears further examination. The "hostile takeover by Supply" perception helps in explaining transporters' generally negative responses to the questions on how the LRS reorganization impacted the distribution process and Distribution Flight operations. The supply-transportation merger, while logical and rational, eradicated long-standing Air Force cultural and organizational identities, introduced major change as September 11 occurred, and exacerbated transportation internal functional and career stovepipes. However, even the more negative interviewees recognized that with good leadership and guidance, they would adapt to the new structures and processes. Again, most of the interviewees showed a clear bias in favor of the reorganization and pride in having established a functioning LRS in the aftermath of September 11.

The data speak not only to the near-term organizational/cultural difficulties noted above, but also to a longer-term and larger issue of whether the Distribution Flight captured all of the base-level distribution processes in a single organization. Many negative comments and concerns voiced during the interviews were about base-level functions that had *not* been included in the Distribution Flight and were seen as being just as integral to the base distribution process as the functions that had been included. In particular, interviewees questioned the wisdom of splitting traffic management expertise (2T0s) between the Distribution Flight (which moves cargo) and a Traffic Management Flight (which moves passengers and personal property).

At any point above base level, the distribution process makes no distinction between what is moved. Further, the JP 1-02 definition of traffic management as "the direction, control and supervision of all functions incident to the procurement and use of freight and passenger transportation services" appears to give that function the lead role in distribution. Again, a process-driven approach to improving base-level support to overall Air Force operations can make the case for further combining the Distribution Flight and the Traffic Management Flight.

Interviewees noted the same process disconnect with the pickup and delivery function, which, under the new LRS structure, was moved to the Vehicle Management Flight and performed by vehicle operators. Pickup and delivery traditionally have been supply functions often colocated with transportation/traffic management's inbound and outbound freight sections. As part of the LRS merger, however, the responsibility was given to Vehicle Operations (base motor pool and drivers). Given that Vehicle Operations is primarily a civilianized function, the personnel there neither welcomed the new responsibility nor saw the rationale behind it. From a process perspective, pickup and delivery are as much a part of the distribution process as traffic management. Yet under the new LRS, these functions are now housed in three separate flights.

Logistics Readiness Squadron Operations

The CLR test directed not only an evaluation of MM as a process, but also a fundamental base-level reorganization to test the hypothesis that a more integrated organizational structure would drive a more integrated MM process, resulting in significant process improvements. Test bases were directed to reassign all transportation and supply resources (personnel, facilities, and equipment) to a provisional LRS that further integrated many formerly separate supply and transportation functions into six new flights. This was a daunting task at many of the test bases, especially because of the additional deployments and security demands generated by September 11.

This KRA investigated how traditional supply and transportation operations, specifically the MM functions, were impacted by the merger into the new LRS. The questions were aimed at identifying whether the LRS merger triggered any unintended consequences for functions (such as fuels management) that were transferred into the LRS without being changed.

Analysis Insights

The interview teams asked, "How has the [LRS] restructuring impacted operations in LRS Flights?" as a six-part question by specific flight rather than asking a single overarching question such as "How have LRS operations (overall) been impacted by the restructure?" Table 5.4 averages the six by-flight responses as percentages in an attempt to provide an overview of how LRS operations as a whole were seen by the total interview population and the two key affected functional groups: supply and transportation.

For the total interview population, 65 percent saw no change from the restructuring or said they did not know enough to make a judgment. Overall, it appears that a majority of interviewees saw no obvious immediate impact on LRS operations. In addition, there was a near-even split between LRS operations being perceived as "better" (17.8 percent) and as "worse" (16.2 percent), establishing neither a positive nor a negative trend for the examination all LRS operations as reflected by the total interview population.

Table 5.4
LRS Operations—By-Flight Responses

ALL—MAF/CAF (78)	Supply (49)	Trans (24)	Total (78)
Better	21.7%	11.8%	17.8%
Unchanged	37.9%	31.9%	38.6%
Worse	15.8%	20.8%	16.2%
Don't Know/No Opinion	22.4%	37.9%	26.4%

However, there is an indication of a potential split between the responses by the transporters and the supply personnel to this series of questions. While the "unchanged" and "don't know" answers of these two groups were relatively consistent with the total population response, supply personnel were almost twice as likely as transporters to rate LRS operations as "better" (21.7 versus 11.8 percent). The percentage of supply personnel who rated LRS operations as "better" was nearly identical to the percentage of transporters who rated them "worse" (21.7 and 20.8 percent, respectively).

This was one method employed to get a rough picture of the perceptions of overall LRS operations in response to the KRA. However, interviewees were not asked to rate LRS operations as a whole. The by-flight responses in Table 5.4 are valuable as a contrast to the by-flight responses that follow, and as a way to highlight the uneven impacts of restructuring on LRS operations. The method of comparison may also be useful as a potential way to benchmark Air Force–wide LRS restructuring by degree of difficulty, by AFSC, and by flight.

The following six subsections each present interviewee responses to one of the six by-flight questions asked during the site visits in the order asked and by the same four population sets: supply personnel, transporters, others, and total. Each subsection also provides a representative sampling of interviewee and data comments.

Distribution Flight

Table 5.5 shows the results for the Distribution Flight.[4] As can be seen, in this flight, supply personnel were more than twice as likely as transporters to see the impact of the restructure as being "better."

[4] The Distribution Flight combined the (mostly) transportation functions of inbound/outbound cargo movement with the supply functions of MM. The intent was to fix responsibility for the base-level distribution process in a single organization.

Table 5.5
Impact of Restructuring Operations in the Distribution Flight

ALL—MAF/CAF (78)	Supply (49)	Trans (24)	Other (5)	Total (78)
Better	55%	21%	40%	44%
Unchanged	16%	16%	40%	18%
Worse	21%	21%	0%	19%
Don't Know/No Opinion	8%	42%	20%	19%

Transporters were evenly split between perceptions of "better" and "worse," but 42 percent of the transporters, versus only 8 percent of the supply personnel, answered "don't know."[5]

The majority of the comments were positive, and interviewees consistently cited the logic of combining the processes into a "distribution flight"—that is, "two natural functions working together . . . [by] having warehouse, receiving, shipping working together." Concerns surfaced about the specific transportation AFSC issues of splitting an already small 2T (Transportation, Traffic Management) enlisted population between the Distribution and Traffic Management Flights, and the placement of a cargo movement function, pickup and delivery, in the Vehicle Management Flight.

Readiness Flight

Table 5.6 shows the responses for the Readiness Flight.[6] These data reflect an extremely even split across responses and by functional area. The "better" and "worse" responses are evenly split by total population but are inversely proportional by function. Supply personnel and transporters seem to have evaluated impact in near-exact opposite terms: 37 percent of supply personnel rated it as "better,"

[5] See this chapter's discussion of the distribution process performance KRA, above, for a detailed analysis that includes Distribution Flight operations.

[6] The Readiness Flight combined the functions of contingency training (Transportation), including planning in test sites where Logistics Plans was added to LRS; Squadron Readiness Control Center (combined some Logistics Plans, supply personnel; former transportation deployment/reception function); war readiness (Supply); and in non-AMC bases, Air Terminal Operations (Transportation).

and 33.3 percent of transporters rated it as "worse." And 25 percent of transporters answered "better," while 22 percent of supply personnel answered "worse." The overall comments, however, revealed a much more positive view of the degree to which the LRS restructure improved the base deployment process.

Comments differed significantly by base, but not by CAF/MAF. Interviewees from one MAF base facing a pre-CLR operational readiness inspection (ORI) formed the Readiness Flight early and praised it for how well it worked. As a result of the obvious success, interviewees were extremely positive about how the LRS restructure drove improvements in the Readiness Flight. Comments cited "improvements to the deployment process" and "the synergy of supply and transportation working together as a team" as welcome but "surprise" impacts of LRS reorganization. Other bases, however, cited resource management, leadership problems, size and scope of the LRS, and differences in the handling of mobility as issues. Variables in perceptions could be a function of size, span of control, or interaction with other base deployment process participants outside the Readiness Flight (for example, aerial port, personnel readiness, and medical). Real-world deployments as a consequence of September 11 also made it difficult to identify whether problems were a result of LRS restructure or the spike in operational tempo. Whether their responses were positive or negative, however, interviewees tended to see Readiness Flight operations mainly in terms of how well the deployment process worked and the degree to which Readiness Flight captured the whole "base deployment machine" in one organization.

Table 5.6
Impact of Restructuring Operations in the Readiness Flight

ALL—MAF/CAF (78)	Supply (49)	Trans (24)	Other (5)	Total (78)
Better	37%	25%	0%	31%
Unchanged	16%	17%	20%	17%
Worse	22%	33%	80%	29%
Don't Know/No Opinion	25%	25%	0%	23%

Management and Systems Flight

Table 5.7 shows the results for the Management and Systems Flight.[7] As can be seen, the relatively even split between the "better" and "worse" responses is consistent both within and among the three population samples. There is no significant difference between the perceptions of the supply personnel and the transporters except for the degree to which both groups answered "don't know" (50 versus 14 percent). This is not surprising considering the dominance of supply functions in this flight. The data appear to reflect a "wait and see" attitude toward evaluation of the impact. In addition, the data may have been affected by the relatively few management and systems personnel interviewed. As noted below, the comments obtained indicate some difficulties that may reflect larger issues concerning the restructure's impact on LRS operations.

Interviewee comments add a lot to this seemingly benign data set. Many noted supply squadrons (for the most part, significantly larger than transportation squadrons but having far fewer AFSCs, data systems, and separate funding lines) came to the merger with formal funds, training, and systems functions intact, having earned, by virtue of their size, dedicated manpower to perform these functions. The transportation squadrons (for the most part, smaller than

Table 5.7
Impact of Restructuring Operations in the Management and Systems Flight

ALL—MAF/CAF (78)	Supply (49)	Trans (24)	Other (5)	Total (78)
Better	19%	12.5%	0%	15%
Unchanged	51%	25%	80%	45%
Worse	16%	12.5%	0%	14%
Don't Know/No Opinion	14%	50%	20%	26%

[7] The Management and Systems Flight includes five elements: customer service (Supply), funds management (Supply/Transportation), systems management (Supply/Transportation), squadron training (Supply/Transportation), and procedures and analysis (Supply). The bulk of the functions and population are former Supply resources.

the supply squadrons) rarely earned enough manpower to manage their host of separate AFSCs, systems, and funding lines as anything other than additional duties.

Negative comments came from interviewees perceiving the more experienced supply personnel as having to fix the less-well-managed transportation training, systems, and funds functions. Many also cited concerns with this flight experiencing a major workload increase by having to manage four separate core transportation AFSCs. One of the core AFSCs, Vehicle Maintenance (2T3XX), has six additional special experience identifiers (SEIs), further increasing the management responsibility. In contrast, several interviewees noted that Supply had only two core AFSCs and one basic data system (the Standard Base Supply System, or SBSS), so the learning curve in this flight would likely be steep in the near term. On the other hand, interviewees noted that Transportation, and thus the LRS as a whole, would benefit in the longer term from having full-time manpower to manage training, systems, and funds.

Traffic Management Flight

Table 5.8 shows the data for the Traffic Management Flight.[8] What stands out in this data set is the ratio of "better" to "worse" answers across all populations, but particularly in Transportation. None of the transporters and only 8 percent of the supply personnel saw operations in the Traffic Management Flight improving as a result of the restructure.

Interviewee comments supported the somewhat pessimistic view revealed in Table 5.8. Most concerns centered on how the traditional base Traffic Management Office (TMO) functions (cargo, passenger and personal property) and the Traffic Management enlisted/civilian supervisory expertise (2T0XX) were divided between the new Traffic

[8] The LRS-restructured Traffic Management Flight is a scaled-down version of the traffic management function found in traditional transportation squadrons. It consists of two elements—personal property and passenger. In its new configuration, the flight retains responsibility only for the movement and storage of personal property and official travel of DoD personnel, having transferred cargo management functions (inbound/outbound freight, packing and crating, air terminal operations in non-AMC bases) to the Distribution Flight.

Table 5.8
Impact of Restructuring Operations in the Traffic Management Flight

ALL—MAF/CAF (78)	Supply (49)	Trans (24)	Other (5)	Total (78)
Better	8%	0%	20%	7%
Unchanged	33%	58%	60%	42%
Worse	18%	25%	0%	19%
Don't Know/No Opinion	41%	17%	20%	32%

Management Flight and the Distribution Flight. Interviewees voiced concerns about 2T0XX career progression (same AFSC, two flights), the hard choice of where to put very limited former TMO supervisory expertise (Traffic Management Flight or Distribution Flight), and fears that the new, smaller flight might be downgraded to an element, opening a new round of reorganization. Interviewees' negative responses also included concerns about splitting the distribution process between the Distribution and Traffic Management Flights and a third flight, the Vehicle Management Flight.

Vehicle Management Flight

The results for the Vehicle Management Flight are shown in Table 5.9.[9] According to the data, the transporters were somewhat more pessimistic than the supply personnel in seeing that the restructure would have a near-term negative impact on the Vehicle Management Flight. On the other hand, an average of 75 percent of all populations answered "no change" or "don't know" to this question. Once again, although the data support a "too soon to tell" interpretation of the restructure's impact, the Vehicle Management Flight represents a unique challenge to future LRS operations.

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[9] The Vehicle Management Flight is the result of merging two traditionally separate and distinct transportation functions, vehicle operations and vehicle maintenance, into a single flight under the new LRS. The Vehicle Management Flight has three elements: administration, operations, and maintenance. Although retaining its total transportation identity, the new flight gained responsibility for the pickup and delivery functions formerly shared (depending on the base) by Supply and Transportation freight personnel.

Table 5.9
Impact of Restructuring Operations in the Vehicle Management Flight

ALL—MAF/CAF (78)	Supply (49)	Trans (24)	Other (5)	Total (78)
Better	12%	13%	0%	11%
Unchanged	37%	29%	40%	35%
Worse	10%	17%	40%	14%
Don't Know/No Opinion	41%	41%	20%	40%

Although it was difficult to capture in the data, there was general agreement among the interviewees (including those from the Vehicle Management Flight) that the most resistance to the LRS restructure came from within this transporters-only flight. Several criticized the transfer of the cargo pickup and delivery functions from supply to the vehicle operations element of the Vehicle Management Flight, which required the base motor pool drivers, heavily civilian, to learn cargo accounting procedures. The more widespread concerns came from within the transportation vehicle community itself and reflected resistance to the LRS attempt to merge two unmergible entities. Interviewees were frustrated with a Vehicle Management Flight that could not grow its own leadership under current career and training standards. More to the point, operators and maintainers could see no logical way to merge their AFSCs, given the very different skills required and the different methods by which manpower was derived.

Fuels Management Flight

Table 5.10 shows the results for the Fuels Management Flight, which was only slightly affected by the LRS restructure because it was moved intact from one squadron to another.[10] Given that this unit had formerly been within the supply squadron, the 88 percent "unchanged" response voiced by the supply personnel who were interviewed can be seen as the most accurate depiction of the impact. And

[10] The highly specialized fuels management function moved intact from the existing Supply Squadron to the new LRS. The Fuels Management Flight has four elements: fuels operations, fuels information and service center, compliance and environmental, and cryogenic production.

it was not surprising that a majority of transporters responded to this question with "don't know." The isolated negative comments were concerns about officer career broadening—that is, that there were too many functions under the LRS for officers to become competent in any one. The fuels functional area was seen as one of those losing its few experienced officers to the greater logistics career good.

Table 5.10
Impact of Restructuring Operations in the Fuels Management Flight

ALL—MAF/CAF (78)	Supply (49)	Trans (24)	Other (5)	Total (78)
Better	0%	0%	0%	0%
Unchanged	88%	46%	100%	76%
Worse	2%	0%	0%	1%
Don't Know/No Opinion	10%	54%	0%	23%

Summary Observations

The general perception of a majority of interviewees was that CLR was a success in just having accomplished the task of establishing a functioning LRS. On the whole, however, most interviewees were able to distinguish between the near-term problems associated with process change, loss of old/adjustment to new squadron identities, learning new skills, and taking on new responsibilities, and the longer-term career issues noted.

Overall, most recognized the value of the Supply/Transportation merger into LRS. Perceptions of LRS restructure were shaped largely by the quality of senior leadership and, as many interviewees noted, the ability of those leaders to translate CLR guidance into meaningful and positive direction.

Supply/Transportation Enlisted Career Development

This KRA analyzes the longer-term career impact of the change on the LRS personnel most affected by the merger of supply and transportation and most responsible for the daily operations in the new squadron: the supply and transportation enlisted force.

It is important to note that the analysis of this KRA draws heavily on data and observations outlined in the analyses of distribution process performance and LRS (see above). In particular, a secondary hypothesis recognizes the degree to which perceptions of the impact of the Supply/Transportation merger on LRS operations, by flight and by functional identity (supply or transportation), drive perceptions of the impact of the merger on career development.

While recognizing that the CLR test, and especially the supply/transportation merger, would inevitably generate immediate training issues and longer-term career issues, the test proceeded on the assumption that the current enlisted AFSC structure would be maintained and the impact on enlisted specialties would be limited.[11]

The CLR test included the establishment of a Technical Training Team to work specific initiatives to improve and sustain the experience level of the enlisted logistics (supply, transportation, fuels, logistics planning, and aircraft maintenance) force. The team primarily focused on improving cross-utilization training, standardizing MDS training requirements, providing documentation and training for wartime tasks such as tank buildup and battle damage repair, and increasing training opportunities through improved management and availability of training managers.

Analysis Insights

The interview teams asked the question, "How will the supply/transportation merger impact enlisted [career] development?"

Table 5.11 shows the six possible responses as percentages of the interview population by functional area. The data reveal a distinct split between the supply and transportation personnel's perceptions of how the merger would affect enlisted career development.

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[11] U.S. Air Force, *CLR Integrated Test Plan, Annex C, Supply and Transportation Squadron Merger,* July 2, 2001, paragraph 3.1.

Table 5.11
Impact of Supply/Transportation Merger on Enlisted Development

ALL—MAF/CAF (74)	Supply (50)	Trans (23)	Total (73)
Considerably Better	2%	0%	1%
Better	32%	4%	23%
Unchanged	44%	22%	38%
Worse	18%	35%	23%
Significantly Worse	4%	26%	11%
Don't Know/No Opinion	0%	13%	4%

Also note that Table 5.11's responses are strikingly similar to the responses given for previous KRAs as to the impact on enlisted careers. When asked about the impact of the merger on enlisted careers, the total population was evenly divided between "better" (23 percent) and "worse" (23 percent). When the responses are divided by functional area, however, the near-inverse perceptions of the supply personnel and transporters are evident.

Table 5.12 is particularly revealing in several ways. First, it shows the supply/positive and transportation/negative perceptions of the LRS merger's impact on enlisted career development. That is, 34 percent of the supply personnel compared to 4 percent of the transporters see their career field improving as a result of the reorganization, whereas 61 percent of the transporters compared to 22 percent of the supply personnel see it as having the opposite effect.

Table 5.12
Impact of Supply/Transportation Merger on Enlisted Development, Consolidated Data

ALL—MAF/CAF (73)	Supply (50)	Trans (23)	Total (73)
Better	34%	4%	25%
Unchanged	44%	22%	37%
Worse	22%	61%	34%
Don't Know/No Opinion	0%	13%	4%

The data also show another contrast between supply personnel and transporters. Of the supply personnel interviewed, 78 percent see the impact of the merger on their careers as either positive or having no negative impact, whereas only 26 percent of the transporters share that view. The 4 percent to 61 percent positive-negative split within the interviewed transportation population, however, highlights the significant concerns about enlisted career issues that appear to be linked closely with negative perceptions of the reorganization. Again, objective differences between the two career fields appear to be the core issue with respect to perceptions of impact.

When this interview sample was sorted by CAF and MAF, some additional distinctions appeared, not just between supply and transportation personnel but also between the two major Air Force weapons system operators (see Table 5.13).

What stands out in these data is the degree to which interviewees from CAF test bases appear to have significantly more negative perceptions than do interviewees from MAF test bases with regard to the restructure's impact on enlisted career development. None of the CAF transporters interviewed were positive about enlisted careers under the reorganized LRS, and a significant proportion, 83 percent, were negative. What is even more interesting is that the highest overall positive from any group was the 46 percent of CAF supply personnel interviewees that saw improvements to enlisted careers as a consequence of the merger.

Summary Observations

The data on the impact of the LRS restructure on supply/transportation enlisted career development nearly duplicate the supply/positive, transportation/negative perceptions seen in the LRS operations and distribution process KRAs.

What first stands out when comparing this KRA with the other two is the degree to which the majority of respondents (regardless of rank or career field) seemed to target transportation AFSC issues as areas of concern no matter whether the questions were directed at process (distribution KRA), operations (LRS KRA), or personnel

Table 5.13
CAF/MAF Impact of Supply/Transportation Merger on Enlisted Development, Consolidated Data

Response	ALL—MAF/CAF (73)		CAF (36)		MAF (37)	
	Supply (50)	Trans (23)	Supply (24)	Trans (12)	Supply (26)	Trans (11)
Better	34%	4%	46%	0%	23%	9%
Unchanged	44%	22%	37%	8%	50%	36%
Worse	22%	61%	17%	83%	27%	36%
Don't Know/No Opinion	0%	13%	0%	8%	0%	18%

(enlisted career KRA). At least from the transportation view, the significant concerns about enlisted career issues appear to be linked with negative perceptions of the LRS reorganization. Perceptions of adverse impact on the supply enlisted career field were minimal. Although the intent of the merger was to streamline and improve logistics processes by selective merging of supply and transportation functions within the LRS flight structure, the new flight organization may have had the unintended consequence of exacerbating an already internally stovepiped enlisted transportation career field.[12]

Enlisted transportation career concerns centered on the way in which the LRS structure split the 2T0 (traffic management, cargo, passenger, and personal property) enlisted personnel between the Distribution Flight and the Traffic Management Flight, and yet attempted to combine the two vehicle enlisted personnel (2T1 vehicle operations and 2T3 vehicle maintenance) into the Vehicle Management Flight.

Deployment Planning and Execution

It was expected that the realignment of Logistics Plans would be met with mixed reviews, given that this is a highly emotional issue for logistics planners. Personnel expressed concern that removing logistics planners from Wing Plans would result in their being buried in a squadron and subsequently finding it difficult to execute their wing crosscutting functions. During deliberations in CLR Phase 1, strong arguments were made in favor of retaining logistics planning as a wing staff agency, and strong arguments were made for aligning logistics planners, along with other logistics functions, within a group led by seasoned logisticians. With the decision to align under the LG, the

[12] Not all transporters are the same. Enlisted transporters have been historically divided among and stovepiped within four distinct enlisted career fields: 2T0 traffic management, 2T2 air transportation, 2T1 vehicle operations, and 2T3 vehicle maintenance (further subdivided into six SEIs). Base transporters (2T0, 2T1, 2T3) are normally in the transportation squadron and fall under the LG; "aerial porters" (2T2) are a separate culture and career path, even for most officers, and normally work for the OG.

Wing Plans option was excluded from the CLR test, narrowing the evaluation to one of determining the best location within the LG. Preliminary thoughts were that given the option of aligning under the LSS or the LRS, the latter was preferable because it would align planners with their supply and transportation brethren rather than putting them in the more maintenance-centric LSS.

This KRA, derived from MAJCOM inputs and subsequent CLR near-term initiatives, aligns Logistics Plans under the LG commander and merges Supply and Transportation. All three of these functional areas are principal process owners of parts of the deployment planning and execution process. Accordingly, evaluating the effect of these changes on the deployment process became a key indicator of the success or failure of the initiatives.

From the outset, the Air Force expected that the two initiatives would have a positive effect on the deployment execution process by bringing all three functional areas together under a single O-6 at the wing level: the Logistics Group Commander (LG/CC). The Air Force also expected that aligning Logistics Plans in the LRS Readiness Flight, as tested at four test bases, would have an even more positive effect on deployment execution. Having all three functions aligned, not only in a single group but in a single squadron, was intended to ease the coordination and accomplishment of tasks such as war reserve materiel (WRM) management, deployment augmentee training, and mobility bag and small arms management—tasks common to all three functions. There was concern from logistics planners, however, that removing them from Wing Plans offices, a staff-level function, and realigning them within the LG might negatively impact deployment and AEF planning functions that require coordination with operations planners.

Analysis Insights

Quantitative measures related to this KRA offered little insight into the effect of the Logistics Plans alignment and the supply/transportation merger on deployment planning and execution. The task of gathering and analyzing data for deployment augmentee training and departure scheduling was complicated by the absence of historical data and the short test duration.

Insights from monthly reports often mirrored data gathered during site interviews. Some bases found that compared to the pre-CLR alignment, the alignment of the three functions in the same group—and, in some cases, the same squadron—offered synergies that led to tremendous improvements. Other bases highlighted concerns about the effects of the realignment on the LRS's span of control, logistics planners' access to wing leadership, and about the focus of the Installation Deployment officer (IDO) being diluted with respect to wing versus squadron responsibilities.

In conducting interviews, we attempted to delineate between deployment planning and deployment execution. Two of our interview questions were designed to address how the realignment of Logistics Plans under the LG impacted deployment planning. The first question focused on coordination with Wing Plans, which is generally related to deployment planning, not deployment execution. The second question focused on how the realignment impacted management of AEF tasking, a planning process requiring logistics plans coordination across multiple squadrons and with Wing Plans.

Table 5.14 shows the responses, grouped by function, for the first question: "How has coordination with Wing Plans been impacted as a result of the Logistics Plans realignment?"

The data in the table reveal significant response disparity not only between operators (representing Wing Plans) and logistics planners as to whether or not coordination had been changed, but also

Table 5.14
Impact of Logistics Plans Realignment on Coordination with Wing Plans for Deployment Planning

ALL—MAF/CAF (32)	Operators (9)	Planners (23)	Total (37)
Better	0%	0%	0%
Unchanged	33%	61%	53%
Worse	67%	39%	47%
Don't Know/No Opinion	0%	0%	0%

among logistics planners. The majority of planners (61 percent) thought it had not changed at all, while a significant number (39 percent) thought it had worsened.

These numbers were generally the same whether the base was testing a transition from Wing Plans to a squadron within the LG or a transition from one LG squadron to another. Further investigation of the comments explaining the "unchanged" responses found that 50 percent of these respondents had pointed out that they had not physically relocated. Those colocated with Wing Plans before CLR remained colocated after realigning, and those not colocated retained their physical location as well. Further investigation of those responding that coordination was "worse" revealed that 71 percent had provided one of two major reasons for their responses: Either the Logistics Plans aligned within the LG was "buried" layers deep in a squadron, creating additional administrative layers that negatively impacted coordination, or the responsibilities between Wing Plans and the realigned Logistics Plans shop were no longer clear, which hampered communications.

The other question targeted at evaluating the impact of the Logistics Plans realignment on deployment planning was, "How has management of AEF deployment tasking been impacted as a result of the realignment?" The responses are presented in Table 5.15, grouped by functional areas.

There were concerns with the alignment of AEF tasking management responsibilities and a fear that positioning Logistics Plans

Table 5.15
Impact of Logistics Plans Realignment on Deployment Planning for AEF Tasking

ALL—MAF/CAF (37)	Operators (14)	Planners (23)	Total (37)
Better	21%	30%	27%
Unchanged	71%	39%	51%
Worse	7%	26%	19%
Don't Know/No Opinion	0%	4%	3%

deeper in an organizational structure would slow down the planning process and coordination associated with AEF tasking management; these were connected with the 19 percent who responded "worse." Those that perceived the management of AEF tasking as better (27 percent) commented that having a group commander ultimately responsible for the process was a benefit.

Table 5.16 shows the responses to the question we asked to assess the impact of the realignment on deployment execution: "How has deployment execution been impacted as a result of the Logistics Plans realignment?" The responses are broken out by MAF and CAF because one hypothesis held that realigning would have a different effect across the commands as a result of differing deployment missions.

The data reveal that across both the MAF and the CAF units, a majority of interviewees (81 percent) perceived deployment execution as "better" or "unchanged" as a result of the realignment of Logistics Plans. While the data did not reveal major differences based on mission type (that is, MAF versus CAF), they did reveal that units transitioning from Wing Plans to a squadron in the LG—as was the case with all MAF units—were more inclined to view the process as "worse." A majority of the 22 percent of MAF interviewees responding "worse" were logistics planners, the process owners.

The comments supporting the negative opinions were tied mostly to the realignment's effect on the IDO's focus, essentially splitting it between squadron readiness responsibilities and wing deployment responsibilities. Those same logistics planners also felt realignment within the LG allowed too many people to be involved in

Table 5.16
Impact of Logistics Plans Realignment on Deployment Execution

Response	CAF (18)	MAF (45)	Total (63)	Planners (23)
Better	56%	40%	44%	35%
Unchanged	33%	38%	37%	26%
Worse	11%	22%	19%	39%
Don't Know/No Opinion	0%	0%	0%	0%

the process (that is, answering to the LRS or LSS commander, the LG, and the wing commander) when current policy states that they report to the wing commander for deployment execution.[13] In spite of the negative responses, the general population believed that deployment execution was being accomplished with more efficiency and more effective use of the personnel involved.

We also asked questions to directly gauge opinions about the alignment in the LG and preferred placement within the group. These questions, asked as part of the contingency planning question set, were as follows:

- Are you favorable or unfavorable to the alignment of Logistics Plans functions under the LG?
- For alignment under the LG, are you more favorable to alignment within the Logistics Support Squadron or the Logistics Readiness Squadron?

Table 5.17 shows the responses for the first question. As the data reflect, the realignment was viewed positively by 76 percent. As usual, interviewees were given a chance to comment on their selection for each question.

Table 5.18 gives the responses for the second question, preferred placement within the LG. Those supporting LSS alignments viewed the squadron as an executive staff to the LG commander and believed alignment there would better support process execution; they would have more access to the LG. In some cases, support for the LSS was less of a vote for the LSS and more of a vote against the LRS, highlighting concerns about span of control of an LRS with Logistics Plans functions incorporated. Those supporting LRS alignment saw benefits to having logistics planners aligned with other readiness functions. When individuals responded with "other" or "don't know,"

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[13] U.S. Air Force, *Deployment Planning and Execution*, Air Force Instruction 10-403, April 14, 2003.

Table 5.17
General Acceptance of Logistics Plans Alignment in the Logistics Group

ALL—MAF/CAF (71)	Maintainers (12)	Operators (16)	Planners (30)	Supply Personnel (7)	Transporters (6)	Total (71)
Favorable	92%	62.5%	70%	100%	83%	76%
Neutral	0%	12.5%	3%	0%	0%	4%
Unfavorable	8%	25%	27%	0%	17%	19%
Don't Know/No Opinion	0%	0%	0%	0%	0%	0%

Table 5.18
Preferred Alignment of Logistics Plans Within the Logistics Group

ALL—MAF/CAF (66)	Testing in LRS (38)	Testing in LSS (28)	Total (66)	Planners (28)
LSS	66%	47%	57%	61%
LRS	32%	39%	35%	28%
Don't Know/No Opinion/Other	2%	14%	7%	11%

they were generally voting against aligning in the LG, preferring to keep Logistics Plans aligned at a wing-level Wing Plans office.

In addition, we asked transportation and supply personnel who were interviewed to provide their views on the alignment of Logistics Plans within the LRS. This was done as part of the MM question set, using a question designed to determine how favorable the supply and transportation communities were to having Logistics Plans integrated as a part of the newly developed LRS that was merging the supply and transportation functions. We asked, "How favorable are you to integrating Logistics Plans functions into the Logistics Readiness Squadron?"

Table 5.19 shows how these personnel responded. As can be seen, personnel in the CAF were generally favorable to integrating Logistics Plans in the LRS, whereas personnel in the MAF were split. Those in the MAF that were favorable to the alignment liked the idea of having all deployment functions together in one squadron. Those unfavorable expressed concerns about span of control and felt that

Table 5.19
Materiel Management Interviewees' Acceptance of Aligning Logistics Plans in the LRS

ALL—MAF/CAF (73)	CAF (34)	MAF (39)	Total (73)
Favorable	59%	36%	47%
Neutral	29%	18%	23%
Unfavorable	6%	41%	25%
Don't Know/No Opinion	6%	5%	5%

plans should either be in the Wing Plans or in an LSS, again viewing an LSS as an executive function for the LG commander.

Summary Observations

The data gathered from interviews and reported monthly by test bases reflected strong opinion in favor of aligning Logistics Plans within the LG. General opinion favored alignment in the LSS versus the LRS. Pre-test expectations of Air Force contingency planners were that alignment within the LRS would be preferred. Opinions in both of these areas consistently reflected a split with respect to two areas: career development and process execution. In both cases, interviewees supported their general responses with comments reflecting their perception of how these two areas would be affected. Opinion favoring alignment within the LRS centered on the notion that while having all deployment functions together in one squadron was of value, opportunities for Logistics Plans, Supply, and Transportation to interact were of greater value. Opinions favoring alignment in the LSS centered on the fact that LSS alignment created a squadron commander's billet for the Logistics Plans officers and provided enlisted and civilian personnel more exposure to senior officers. In addition, process execution was seen as being easier and less of an administrative burden given that the LSS would be viewed as an LG staff function.

Career Development Impacts for Officer, Civilian, and Enlisted Personnel

In addition to considering the effects of Logistics Plans realignment on process performance, the study also considered how realignment would impact career development. Pre-test expectations were that there would be little impact on career development for Logistics Plans enlisted personnel and civilians; and, given that officer development was already being impacted as a result of developing the logistics readiness officer career path, it would have some effect on career development for officers. The impact on career development is not something that can be evaluated over the course of a six-month test period, however. For that reason, the analysis focused on perceptions of how the changes would impact career development.

Analysis Insights

Analysis for this KRA was accomplished using purely qualitative techniques, as no quantitative metrics could be gathered. Interviewees were asked four direct questions. Three pertained to how alignment of Logistics Plans within the LG would affect career development for officers, enlisted personnel, and civilians. The fourth asked the interviewees' opinion on which form of alignment—within the LRS or within the LSS—would be more conducive to officer development. The specific questions were:

- How will the alignment of Logistics Plans within the Logistics Group impact logistics officer development?
- How will alignment under the Logistics Group impact development of Logistics Plans enlisted corps?
- How will alignment under the Logistics Group impact development of Logistics Plans civilian corps?
- Will logistics officer development be better with Logistics Plans alignment in the LSS or LRS?

Table 5.20 shows how interviewees viewed the effect of the realignment on career development for the three groups. As can be seen, the move was viewed very positively (90 percent said "better") in terms of its impact on officer career development.

The overwhelmingly positive responses were linked to the notion that the logistics plans officer would now work for a seasoned logistician and have more cross-flow opportunities with supply and transportation officers. The impact on enlisted training was also generally viewed as positive (40 percent). With respect to civilian career development, the responses were split—21 percent said "better," 21 percent said "worse." While few subjects offered comments supporting their views, those that did amplified their view of the realignment

Table 5.20
Impact of Logistics Plans Aligning in the Logistics Group on Career Development

	Career Development for:		
ALL—MAF/CAF	Officers (71)	Enlisted Personnel (78)	Civilians (76)
Better	90%	40%	21%
Unchanged	6%	40%	47%
Worse	4%	14%	21%
Don't Know/No Opinion	0%	6%	11%

being worse for civilian development, stating that they would suffer from a lack of exposure to senior wing leadership by being aligned within a squadron in the LG.

Table 5.21 shows the responses interviewees gave when asked which realignment would be better for officer development. As is readily evident, the responses were generally split.

Further analysis of these responses and the comments found that each of the two preferences commonly aligned with a particular viewpoint. Interviewees that perceived alignment under the LSS as being better for officer career development commented that the LSS put the logistics planner closer to the LG and created a squadron command billet for the logistics plans officer. Interviewees that perceived alignment under the LRS as better commented that LRS provided more opportunities to work with Supply and Transportation and, accordingly, to learn those two other disciplines.

Summary Observations

While opinions on how a Logistics Plans realignment would impact career development varied widely, there is little reason to believe that realigning the function will, by itself, significantly disturb career development opportunities for logistics planners. If the alignment does not affect the functional or supervisory responsibilities of civilian and enlisted Logistics Plans managers, there should be little impact there.

Table 5.21
Perceptions of Which Logistics Plans Alignment Will Be Better for Logistics Plans Officer Development

Response	All Functional Areas (Maintenance, Supply, Transportation, Plans)			Logistics Planners Only		
	MAF (33)	CAF (18)	Total (51)	MAF (17)	CAF (13)	Total (30)
Within LSS	55%	44%	51%	59%	46%	53%
Within LRS	30%	56%	39%	24%	54%	37%
Other/Don't Know	15%	0%	9%	17%	0%	10%

In fact, logistics planners have been operating under the same career development guidelines, while being aligned in both Wing Plans and a logistics squadron, since the inception of the Objective Wing structure. For officer development, creation of the logistics readiness officer career field alleviates concerns of cross-flow between Supply, Transportation, and Logistics Plans. If the logistics readiness officer career path is given sufficient time to evolve, one will most likely not be able to distinguish between those officers on the basis of who was a core Supply, Transportation, or Logistics Plans officer. Accordingly, Logistics Plans alignment within the LG should have little effect on officer development.

Materiel Management and Contingency Planning Recommendations and Conclusions

The AEF concept elevates the importance of deploying, receiving, bedding down, and sustaining combat forces. The CLR initiatives associated with materiel management (MM) and contingency planning (CP) leverage synergies across three functional areas to enable Air Force logisticians to move and sustain combat forces better and faster. While the interview data and monthly reports clearly reflect recognition of the value in merging Supply and Transportation and aligning Logistics Plans within the LG, they also reveal issues that, while not detrimental, could reduce efficiencies that the CLR MM and CP initiatives have the potential of achieving.

The test bases operating MM and CP under the CLR-directed integrated test plan represented an unprecedented effort to improve logistics support to Air Force operations by attempting to combine logistics processes into a new organizational structure, the Logistics Readiness Squadron, or LRS. The intent to let process drive organization is sound, but comparing the observations relative to LRS operations with observations in the related KRAs on distribution process improvement and deployment planning and execution suggests that the six-flight LRS structure may not go far enough to institutionalize long-term logistics process improvement. In that regard, the following recommendations are offered.

The Air Force should consider revisiting the LRS restructure, this time with a view to maintaining the integrity of the distribution process as it is defined and conceptualized by Air Force theater distribution needs. The CLR initiative clearly revealed the value of integrating supply and transportation distribution functions. To be of greatest value to AEF operations, a base-level distribution organization should mirror the larger, theater distribution system and encompass all the related distribution processes, functions, operations, and expertise required to sustain AEF combat forces. The merger, however, introduced challenges in other traditional supply and transportation operations. As noted by many interviewees, the LRS flight structure may have unintentionally broken the distribution process into new and separate pieces while trying to integrate and improve it.

Of the six flights in the LRS, only two, the Distribution Flight and the Readiness Flight, are really driven by a larger core logistics process.[14] The former is supposed to be the single manager for the base distribution process; the latter provides logistics support for the wing contingency planning and deployment/reception, staging, onward movement, and integration (RSOI) process. However, as the by-flight analysis in Chapter Five shows, from a pure process point of view, not all key actors in the distribution process are in the Distribution Flight. Moreover, the degree to which the Readiness Flight owns the wing deployment process varies from base to base depending on the secondary organizational issue of who owns Logistics Plans, the LSS, the LRS, the LG, or the wing.

For example, stepping back from the LRS structure in the current six-flight test configuration and allowing the distribution process to drive a structure could create a Distribution Flight with the following elements:

[14] The other four flights—Traffic Management, Management and Systems, Vehicle Management, and Fuels Management—remain explicit and traditional managers of functions.

- Distribution flight
- Traffic management (overall mode manager, moving all property and cargo)
- Management and systems (fiscal, systems, and personnel support)
- Vehicle operations (pickup and delivery, base cargo movement).

This comprehensive process view could also logically drive 2T2X0s (air transportation personnel, most but not all of whom are assigned to AMC aerial ports) into the larger distribution organization.[15] In the long term, this could heal the long-standing split (which is both organizational and cultural) between the 2T0 (traffic management) and 2T2 (air transportation) career fields, merge the stovepiped AFSCs, and provide a more valid case for true base-level ownership of a distribution process that can plug readily into the multimodal and complex theater and global distribution processes so critical to AEF combat support.

In addition, reorganizing under the distribution process would help address the inability to merge vehicle operations and vehicle maintenance into a vehicle management functional or career track. One solution, again with a process view, would be to move the vehicle maintenance function to the larger maintenance organization. Just as distribution does not care what is moved—cargo or personal property—maintenance (as owner of the sortie production/fleet health process) may not care what is fixed—vehicles, aerospace ground equipment (AGE), or aircraft.

Consider re-evaluating the Vehicle Management Flight and the possibility that the LRS restructure may have had unintended adverse effects on the transportation enlisted career field. The data appear to contradict the CLR test plan assumptions that the Vehicle Management Flight may eliminate some redundancies between the Vehicle

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[15] This synergy was recognized in the U.S. Air Force *CLR Integrated Test Plan, Annex C* (Appendix 2, 8.2) but was not made part of the LRS test structure.

Maintenance and Vehicle Operations flights and that the new flight structure fully accommodates these two distinct core processes.[16]

The pure process view ought to consider the value of moving vehicle maintenance to the greater maintenance organization and integrating vehicle operations, which is now performing the key base distribution functions of pickup and delivery, with the organization that owns the distribution process. This would, of course, eliminate the vehicle management concept, but it would simultaneously solve the very intractable transportation enlisted career problem of how to combine these very different functions. Letting go of the idea that vehicles are distinct from aircraft in terms of maintenance is in the spirit of the CLR test that directed the integration of supply and transportation for the greater MM process good.

Consider aligning core functions associated with deployment planning and execution, force reception, and force beddown in an organization singularly focused on these AEF-critical processes. The CP initiative focused on the alignment of Logistics Plans within the wing structure. This recommendation will first address that initiative and then address the larger issue of creating a core wing-level capability to execute all facets of deployment, reception, and beddown.

Process execution becomes the determining factor for best placement of Logistics Plans. Logistics Plans functions are more wing crosscutting than most other logistics and support functions are. Tasks such as WRM management, developing support agreements, Unit Deployment Manager (UDM) functions, and augmenter training, as well as deployment execution, reception, and beddown planning, touch nearly every organization within a wing, cutting across not only squadrons, but groups as well.

There are benefits to aligning the functions supporting a critical process such as deployment execution within a single organization, as was tested at some bases by integrating readiness functions with the LRS. While personnel commented on the value of integrating readiness functions in one organization, there were various views as to

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[16] U.S. Air Force *CLR Integrated Test Plan, Annex C* (Appendix 6, 8.1).

what constituted readiness functions. Many interviewees identified Logistics Plans, UDMs, air transportation operations (AFSC 2T2XX), and Supply mobility bag and small arms management personnel as readiness personnel. While all of these personnel are tied to deployment operations, only two of the functions—Logistics Plans and Transportation Terminal Operations, are deployment process owners. The other two—UDMs and mobility bags and small arms—are process customers. Every unit with a deployment commitment has a UDM function, which is more closely tied to individual unit readiness, not to the wing deployment process. Along that same line, the mobility bag and small arms personnel interviewed suggested that their function was simply a supply inventory management function, albeit for mobility resources, but no different than the function of any other unit with a commitment to deploy unit cargo or equipment. The distinction between process owner and process customer is important in addressing the alignment of Logistics Plans functions.

One option is to clearly separate functions in organizations, in this case separating wing-wide deployment process execution (process owners) responsibilities from squadron deployment readiness responsibilities (process customers) within the LRS. In doing this, the Readiness Flight might consist of only logistics planning, transportation planning, and air terminal operations functions. Other functions, such as mobility bag and small arms management and UDM functions, would be aligned under other flights. This approach would ensure that the IDO's focus is not diluted during deployment execution and would retain the synergies of having logistics deployment functions under one hat. Possible drawbacks to this approach are that it does little to address the larger concern about the LRS's overall span of control, and it still leaves other wing deployment functions elsewhere in the wing structure.

Another option for aligning Logistics Plans creates a more distinct process focus along squadron lines, clearly delineating between the MM and distribution processes and the deployment and reception process. That option would be to align logistics planners and transportation planners (2T2s) with other wing deployment process stakeholders, such as Personnel Readiness, Operation Plans, Civil Engineering Readiness, and perhaps even Force Protection Readiness, in a separate squadron focused solely on wing deployment planning and execution and force beddown and reception at the deployed location. This option addresses the LRS span of control concern and facilitates execution of cross-cutting wing responsibilities by bringing together core stakeholders of the deployment planning and execution, reception, and beddown processes.

Consider creating new metrics that focus on the distribution process with related segments, and, in turn, show how the base-level distribution process fits into the larger global/theater distribution process. JP 4-09 (Joint Doctrine for Global Distribution, December 2001) identifies the critical nature of this core logistics process. The publication contains guidance on theater distribution and should be used, along with appropriate Air Force publications, to help create an awareness of the degree to which base-level distribution supports the global/theater effort. Current wing-level metrics do not allow end-to-end measure of process performance, however, nor do they tie in larger theater distribution measures. There is value in relating distribution metrics in hierarchical order and defining the terms distribution, materiel management, and pipeline in accordance with a recognized standard such as JP 1-02, the DoD Dictionary, or (recommended) JP 4-09 Joint Doctrine for Global Distribution.

CHAPTER SIX

CLR Summary Recommendations and Conclusions

The CLR initiatives that were tested were intended to improve three core logistics processes: maintenance, materiel management, and contingency planning.[1] The test was designed to evaluate the plan for Air Force–wide implementation of the CLR initiatives and to ensure that the changes brought about by the implementation test did not negatively impact wing-level operations. Against this criterion, the CLR implementation test was a success: There were no detrimental consequences from implementing the CLR initiatives. There are, however, specific issues warranting consideration.

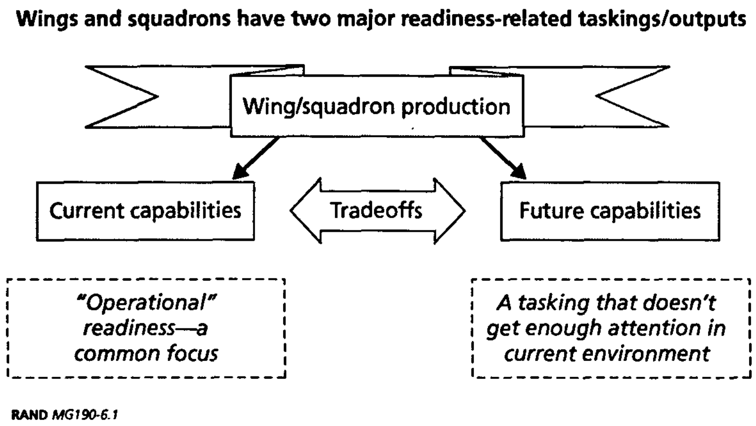
Neither quantitative nor qualitative measures suggest that implementing the CLR initiatives will degrade wing-level operations. However uneventful the test might have been against stated criteria, it highlighted important issues relevant to process execution, function realignments, and human capital. This chapter offers recommendations and conclusions with respect to those issues and their effect on maintenance, materiel management, and contingency planning.

Sortie Production and Fleet Health

The on-site interviews, monthly reports, and metrics did not clearly indicate any significant improvements in sortie production or fleet

[1] A fourth area, technical training and officer development, was not tested during CLR Phase 2.

Figure 6.1
Units Must Balance Current and Future Capabilities



health attributable to the CLR realignment of processes. However, interviewees often noted that the increased focus on fleet health issues caused by the CLR test was a definite success story. At the conclusion of CLR testing and after all data had been analyzed, the original hypothesis made by senior Air Force maintainers held: "Once this fundamental issue (of what it takes to achieve balance) is understood and mechanisms are put in place to achieve that balance, any form of support organization can be made to work, although some may be more efficient than others, and some may be more effective than others."[2]

Improvements in metrics, policy, and policy enforcement have already been experienced; there is, however, a need for further attention. To that end, the following recommendations are offered:

- Continue to encourage and facilitate the use of metrics to balance daily sortie production and long-term fleet health management at the wing level.

[2] Gabreski, Brig Gen Terry L., *Chief of Staff, United States Air Force Logistics Review*, Headquarters AF/ILM, Washington D.C., June 2000.

- Consider implementing additional maintenance and maintenance management policy improvements and additional job performance aids, and further refine training and education opportunities.
- Consider implementing additional activities to monitor, measure, and evaluate policy enforcement.
- Proceed with Air Force–wide implementation of CLR sortie production/fleet health initiatives and consider alternatives to further enhance maintenance process execution.

Materiel Management and Contingency Planning

CLR initiatives associated with materiel management (MM) and contingency planning (CP) leverage synergies across three functional areas to enable Air Force logisticians to move and sustain combat forces better and faster. While the interview data and monthly reports clearly reflect recognition of the value in merging Supply and Transportation and aligning Logistics Plans within the Logistics Group, they also reveal issues that, while not detrimental, could reduce efficiencies the CLR MM and CP initiatives have the potential to achieve. In this regard, the following recommendations are offered:

- Consider revisiting the LRS restructure from the point of view of maintaining the integrity of the distribution process as it is defined and conceptualized by Air Force theater distribution needs.
- Consider re-evaluating the Vehicle Management Flight and the possibility that the LRS restructure may have had unintended adverse impacts on the transportation enlisted career field.
- Consider aligning core functions associated with deployment planning and execution, force reception, and force beddown in an organization that is singularly focused on those AEF-critical processes.
- Consider creating new metrics that focus on the distribution process with related segments, and, in turn, show how the base-

level distribution process fits into the larger global/theater distribution process.

The CLR process offered great insight into the value (and challenges) of implementing transformational changes that are needed for Air Force logistics to respond to new operational and resource challenges. Benefits from the CLR initiatives are already being experienced in the field: an increased focus on sortie production, more attention to fleet health investments, more dialogue between operators and logisticians, more attention to policy and improved policy enforcement, distribution process efficiencies, and perhaps above all, engagement of wing-level senior logisticians in core logistics processes.

In the final analysis, the Air Force–wide CLR implementation issues facing the maintenance community and the materiel management/contingency planning community are different. For Maintenance, the challenge is to continue to forge ahead with organizational realignment while retaining a focus on management fundamentals. For Materiel Management and Contingency Planning, the challenge is to refine the organizational realignments to facilitate change management, mitigate potential roadblocks, and fully realize the value of integrating the distribution process functions and the force deployment, reception, and beddown functions.

Epilogue

In October 2001, just as Phase 2 of the Chief's Logistics Review (CLR) was beginning, Gen Michael E. Ryan, the initiator of CLR, retired from his position as Chief of Staff of the United States Air Force (CSAF).

General Ryan had originally directed a review of Air Force wing-level logistics processes in October 1999, in response to concern about declining readiness trends in aircraft maintenance. This review was called CLR Phase 1. General Ryan limited the scope of the review during Phase 1, instructing CLR participants not to evaluate the organizational structure itself, but to instead evaluate process changes and training deficiencies to find root problems. General Ryan was opposed to major organizational changes or realignment. His opinion was that there had been enough major reorganizations within the Air Force in the 1990s, and he did not want to make any further significant changes.

CLR Phase 2 was the implementation test of the initiatives derived during Phase 1. For this test, 17 bases implemented CLR initiatives in the areas of sortie production and fleet health, materiel management, and contingency planning. The test ran from September 2001 through February 2002.

Succeeding General Ryan as CSAF was Gen John P. Jumper, who had been the USAFE/CC when CLR was initiated. He had briefed General Ryan about a declining readiness trend and had suggested a focused wing structure with a separate maintenance group controlling all aspects of wing maintenance to alleviate readiness issues. Once General Jumper became CSAF, he decided to further investigate the idea of wing reorganization.

Just as CLR Phase 2 was ending, in February 2002, General Jumper put together a working group to examine a standardized wing organizational structure. The purpose of the working group was to present a new wing/group organizational structure designed to best meet the needs of the Air and Space Expeditionary Force. General Jumper, as well as other Air Force senior leaders, had determined that an organizational restructure was needed to improve combat readiness and to enable the Air Force to focus on its core disciplines.[1]

On March 25, 2002, General Jumper and the major commands approved the new Combat Wing Organization (CWO) structure. On April 22, 2002, General Jumper sent out a message via the Defense Messaging System informing Air Force personnel of this new, standardized wing structure, which is depicted in Figure EP.1.

The new wing structure consists of four groups: the Operations Group, the Maintenance Group, the Mission Support Group, and the Medical Group. Their responsibilities are as follows:

- **Operations Group.** Operations Group activities will focus on planning and executing air and space power.
- **Maintenance Group.** Aging fleets and years of resource shortfalls require increased attention to the balance of sortie production and health of our fleet.
- **Mission Support Group.** The Air Force will develop a career path for commanders who understand the full scope of home station employment/sustainment and deployment, beddown, and sustainment at contingency locations: crisis actions, force protection, unit type code preparation, load planning, communications, enroute visibility, reception, contracting actions, bare base/tent city preparation, munitions site planning, personnel readiness, expeditionary combat support, etc.

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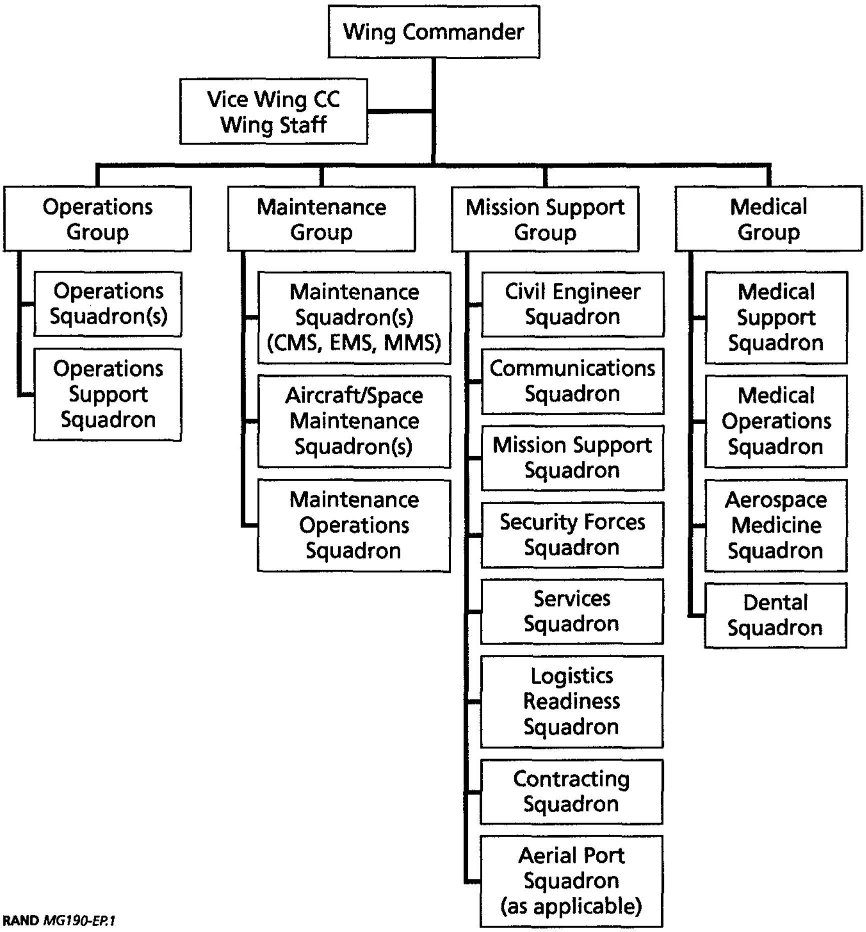
[1] Air Force Working Group, "New Air Force Wing/Group Organizational Structure," Working Group paper, February 2002.

Figure EP.1
New Air Force Standard Wing Structure



RAND *MG190-EP.1*

- **Medical Group.** Medical groups will continue to focus on maintaining a fit and ready force.[2]

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[2] Gen John Jumper, CSAF message transmitted via Defense Messaging System, April 22, 2002.

The new wing structure was to be implemented Air Force–wide as soon as possible. Wings were expected to be initially operationally capable by October 1, 2002, and fully operationally capable by September 30, 2003. General Jumper also took CLR one step further by creating a Maintenance Group, just as many of the CLR interviewees were expecting.

APPENDIX A

Study Targets of Opportunity

This appendix presents an outline of the specific taskings, by targets of opportunity (ToOs), that were used by the MAJCOMs to make study inputs:

1. Maintenance Management

1.1 Describe How to Best Provide Available Aircraft to Support AEF.

1.1.1 Consider how maintenance is controlled day to day and month to month (for example, maintenance control center processes, production superintendent responsibilities).

1.1.2 Consider how maintenance and operations scheduling can be better used to provide best support for AEF flying schedules.

1.2 Describe How to Best Provide Analysis for Maintenance Actions.

1.2.1 Consider predictive capability and deficiency analysis.

1.2.2 Consider deployment of logistics/maintenance information systems.

1.2.3 Consider management of database requirements.

1.3 Describe How to Best Provide Senior-Level Control and Accountability for Maintenance Actions.

1.3.1 Consider maintenance authority levels.

1.3.2 Consider balance between operational requirements and health of fleet (determinations/timing of deferred maintenance actions).

1.4 Describe How to Best Provide Increased Maintenance Discipline.

1.4.1 Consider quality assurance requirements/techniques.

1.4.2 Consider technical order usage enforcement.

1.4.3 Consider maintenance documentation enforcement.

1.4.4 Consider maintenance standardization.

2. Maintenance Inspections (Scheduled and Unscheduled Maintenance)

2.1 Describe How to Best Optimize Scheduled Inspections.

2.1.1 Consider time change/TCTO/in-progress inspection (IPI) requirements and timing.

2.1.2 Consider phase/periodic fleet management.

2.1.3 Consider phase/periodic quality.

2.1.4 Consider manpower requirements.

3. Maintenance Repairs

3.1 Describe How to Best Provide Standardization of Repair Processes Across Different Organizations.

3.1.1 Consider aircrew protection processes (survival equipment, life support, egress).

3.1.2 Consider age/munitions trailer/hydraulic maintenance processes.

4. Sortie Generation

4.1 Describe How to Best Provide Maintenance Capability of Skills (AFSCS) That Bridge Multiple Organizations.

4.1.1 Consider electro-environmental processes.

4.1.2 Consider armament/weapons processes.

5. Training

5.1 Describe How to Increase Priority of and to Best Provide Maintenance Upgrade and Recurring Training (Enlisted).

5.1.1 Consider advocacy/champion for maintenance training at the base level.

6. Ammo Storage and Management

6.1 Describe How to Best Provide Capability to Store and Maintain Special Weapons (for Example, Nuclear).

7. Supply Management

7.1 Describe How to Best Capture Demand/Compute Requirements to Support Weapons Systems.

7.1.1 Consider tailoring kits as appropriate to wartime taskings.

7.1.2 Consider method of developing reachback to support deployed operations.

8. Transportation Management

8.1 Describe How to Best Develop Plans for and Operation of Transportation Portions of Base Deployment Operations.

8.1.1 Consider methods of using centralized control center (for example, ATOC/WOC) for peacetime and wartime operations.

8.1.2 Consider special-purpose vehicle maintenance capability to maintain AGE or munitions trailers.

8.1.3 Consider vehicle operations capability to operate refueling trucks or other delivery vehicles.

9. Logistics Plans

9.1 Describe How to Best Direct Deployment (Command and Control).

9.1.1 Consider needs for standardization of logistics plans processes to support AEF deployments and mobility.

9.2 Describe How to Best Conduct Strategic and War Planning.

9.2.1 Consider JOPES qualifications and currency (potential of development of training database).

9.2.2 Consider site survey currency.

9.2.3 Consider base support plans currency.

9.2.4 Consider host tenant support agreements currency.

9.3 Describe How to Best Manage War Reserve Materiel.

9.3.1 Consider pre-positioned equipment ownership and management.

10. Officer Development

10.1 Describe How to Best Train, Educate, and Sustain Logistics Officers (for Example, Career Development).

10.1.1 Consider accession Air Force specialty codes and accession training in development of career paths.

10.1.2 Consider on-the-job logistics officer training program standardization upon initial base arrival (after technical school).

10.1.3 Consider recurring training and life-cycle training requirements.

10.1.4 Consider cross-flow or career broadening opportunities and staging points.

10.1.5 Consider field grade officer utilization in development of career paths.

10.1.6 Consider retention benefits.

APPENDIX B

Monthly Report Metrics

This appendix lists the monthly metrics that bases were asked to track and report in their monthly reports. Not every base reported every metric. Metrics were requested based on the initiatives being tested at the specific location.

Sortie Production/Fleet Health
UTE Rate (Actual)
MC
Flying Scheduling Effectiveness
Maintenance Scheduling Effectiveness
Sortie Production Performance Indicators
Abort Rate (air + ground)
8-hour Fix Rate (units should report either 8 or 12 hr rate)
12-hour Fix Rate (units should report either 8 or 12 hr rate)
Break Rate
Repeat Rate
Recur Rate
Cannibalization (CANN) Rate
Fleet Health Performance Indicators
NMCM
Average Repair Cycle Days
Average Deferred Discrepancies per Aircraft
Workable TCTO Backlog
Periodic Flow Days (Fleet Average)
Periodic Inspection Time Distribution Interval (TDI) (Fleet Average)
Periodic Inspection Quality Verification Inspection (QVI) Pass Rate
First Five Sorties After Periodic Inspection

Sortie Production/Fleet Health—Continued
Others
Total Not Mission Capable Maintenance (TNMCM)
Total Not Mission Capable Supply (TNMCS)—see Materiel Management below
Quality Assurance (QA) Pass Rate
MOC Data Accuracy
Chargeable and Non-Chargeable Schedule Deviations
- Schedule Deviations (AT)
- Schedule Deviations (HQ)
- Schedule Deviations (MT)

Materiel Management
Base Pipeline Processes
Supply Processing Time
Supply Hold Time
Trans Processing/Cargo Hold Time
Trans Processing/Cargo Hold Time (999 cargo)
Receiving to Storage or Issue
Receiving to Pickup and Delivery
Pickup and Delivery to Customer Receipt
Avg Repair Cycle Days (DIFM)
Inventory Analysis
Total Not Mission Capable Supply (TNMCS)
Warehouse Refusal Rate
Inventory Accuracy Overall
Delinquent Documents
Issue Effectiveness
Stockage Effectiveness
Reverse Post Rate
Delinquent Rejects
% Line Items Stored in APS/FSC and Identified for Direct Delivery
Squadron Administrative Processes
CDC Success/Pass Rate
Squadron Readiness
Aircraft Departure Reliability Rate (Passenger)
Aircraft Departure Reliability Rate (Cargo)
Readiness Training

Contingency Planning Wing Readiness
Ready-to-Load Timing (from deployment or exercise)
Augmentee Training % (all deployment augmentee positions)
UDM Training %

APPENDIX C

Suggested Interviewee List Provided to Test Bases

This appendix presents the suggested interviewee list that was given to each test base. This list contains only recommendations for which personnel to interview. At some bases, personnel other than those listed were interviewed.

Sortie Production/Fleet Health

Wing CC or CV
OG/CC
LG/CC
OSS/CC
LSS/CC
DOGM
Flying Squadron/CC
Flying Squadron/SMO
Flying Squadron/MX NCOIC
Flying Squadron/Pro Supervisor
Crew Chief of Qtr
Flying Squadron/Expediter
Flying Squadron/MX Scheduler
MOO
MOD Superintendent
Wing MX Scheduler
MOC Section Chief

NCOIC Analysis
QA Flight Chief
MSL NCOIC
MXS/CC or EMS/CC
MXS/EMS Superintendent
EMS Phase Dock Chief
Phase Crew Chief

Materiel Management

Wing CC or CV
LG/CC
LRS CC
LRS Ops Officer
LRS CMSgt
LRS Distribution Flt Chief or SNCO
LRS Distribution Flight at-large
LRS Readiness Flt Chief or SNCO
LRS Readiness Flight at-large
LRS M&S Flt Chief or SNCO
LRS Traffic Mgmt Flt Chief
LRS Vehicle Mgmt Flt Chief or SNCO
LRS Fuels Mgmt Flt Chief or SNCO

Contingency Planning

Wing CC or CV
LG/CC
CVX or XP
CVI
EET 1 (Inspectors for DCC or CP)
EET 2 (Inspectors for DCC or CP)
EET 3 (Inspectors for DCC or CP)
OSS/CC

OSX Flight Commander
LSS/CC
LSX Flight Commander
IDO[1]
Logistics Plans SNCO

[1] Substitute another Logistics Plans officer or SNCO if the IDO and LSX flight chief are the same person.

APPENDIX D

Interview Question Sets

This appendix contains the questionnaires for all three areas that were being tested: sortie production/fleet health, materiel management, and contingency planning. The questions each interviewee was asked depended on the initiatives being tested at the interviewee's base. Although not listed, interviewees were offered an additional response, "Don't Know/No Opinion" with each question.

Sortie Production/Fleet Health

Perceptions of Process Performance as a Result of CLR Initiatives

SP/FH 1. How has the realignment of MX functions under the LG impacted the balance between Sortie Production and Fleet Health? (What has influenced your decision the most?) Ref. ToO 1.0.0.

a. Considerably Better
b. Better
c. No Change
d. Slightly Worse
e. Significantly Worse

SP/FH 2. How has the realignment of MOC and PS&D impacted the coordination between the OG and the LG? (How can you tell?) Ref. ToO 1.1.2/2.1.5.

a. Considerably Better
b. Better
c. No Change

d. Slightly Worse
e. Significantly Worse

SP/FH 3. How has the realignment of the MOC functions impacted the capability to control, coordinate, develop priorities, and allocate resources? Ref. ToO 1.1.1.

a. Considerably Better
b. Better
c. No Change
d. Slightly Worse
e. Significantly Worse

SP/FH 4. How has the creation of the MOD under the LG impacted Maintenance Scheduling (FTD, Weapons Load, Phase, wash, TCTO, USM time)? (How can you tell?) Ref. ToO 1.1.2/2.1.5.

a. Considerably Better
b. Better
c. No Change
d. Slightly Worse
e. Significantly Worse

SP/FH 5. How has the creation of the MOD under the LG impacted the Daily Flying Scheduling? (What is the main reason for your response?) Ref. ToO 1.1.2/2.1.5.

a. Considerably Better
b. Better
c. No Change
d. Slightly Worse
e. Significantly Worse

SP/FH 6. How has the realignment of Analysis functions impacted the use of analysis in managing and scheduling? Ref. ToO 1.2.0.

a. Considerably Better
b. Better
c. No Change
d. Slightly Worse
e. Significantly Worse

SP/FH 7. How has the realignment of QA enhanced Sortie Production and/or Fleet Health? Ref. ToO 1.4.4.

a. Considerably Better
b. Better
c. No Change
d. Slightly Worse
e. Significantly Worse

SP/FH 8. How has the realignment of Phase/ISO/PE impacted flow days, Time Distribution Interval (TDI) or Sortie Production/Fleet Health? Ref. ToO 2.1.2.

a. Considerably Better
b. Better
c. No Change
d. Slightly Worse
e. Significantly Worse

Perceptions of Officer/Enlisted Development as a Result of CLR Initiatives

SP/FH 9. How will the realignment of functions under the LG impact enlisted training for the affected functions? Ref. ToO 5.1.

a. Considerably Better
b. Better
c. No Change
d. Slightly Worse
e. Significantly Worse

SP/FH 10. How will the realignment of functions under the LG impact Maintenance Officer development? (Why?) Ref. ToO 10.1.

a. Considerably Better
b. Better
c. No Change

d. Slightly Worse
e. Significantly Worse

Acceptance of CLR Initiatives

SP/FH 11. Overall, are you favorable or unfavorable to the realignment of maintenance functions being tested in CLR?

a. Very Favorable
b. Favorable
c. Neutral
d. Unfavorable
e. Very Unfavorable

Summary Questions

SP/FH 12. What is your top CLR success to date?

SP/FH 13. What is your biggest CLR challenge to date?

SP/FH 14. Have there been any unexpected surprises in implementing CLR?

Opportunity to Capture Other Ideas

SP/FH 15. Is there any area of importance that you feel we did not address? And would you like to make any statements at this time?

Materiel Management

Perceptions of Process Performance as a Result of CLR Initiatives

MM1. How has the merger impacted the base-level distribution process performance? What provides you indications of the impact on process performance? (How do you know?) Ref. ToO 7.5.0.

a. Considerably Better
b. Better

c. No Change
d. Slightly Worse
e. Significantly Worse
f. Don't know

MM2. What impact has the merger had on the base deployment process? (How do you know?) Ref. ToO 9.1.1.

a. Considerably Better
b. Better
c. No Change
d. Slightly Worse
e. Significantly Worse
f. Don't Know

MM3. What impact has the squadron merger had on the relationship between the base and the RSS? (How?)

a. Considerably Better
b. Better
c. No Change
d. Slightly Worse
e. Significantly Worse
f. Don't Know

MM4. How has the restructuring impacted operations in LRS flights?

MM4-1. Distribution Flight?
a. Better b. Worse c. No Change d. Don't Know

MM4-2. Readiness Flight?
a. Better b. Worse c. No Change d. Don't Know

MM4-3. Management and Systems Flight?
a. Better b. Worse c. No Change d. Don't Know

MM4-4. Traffic Management Flight?
a. Better b. Worse c. No Change d. Don't Know

MM4-5. Vehicle Management Flight?
a. Better b. Worse c. No Change d. Don't Know

MM4-6. Fuels Management Flight?
a. Better b. Worse c. No Change d. Don't Know

Perceptions of Officer/Enlisted/Civilian Development as a Result of CLR Initiatives

MM5. How will the supply/transportation merger impact logistics officer development? How/why?

a. Considerably Better
b. Better
c. No Change
d. Slightly Worse
e. Significantly Worse

MM6. How will the supply/transportation merger impact civilian career development? How/Why?

a. Considerably Better
b. Better
c. No Change
d. Slightly Worse
e. Significantly Worse

MM7. How will the supply/transportation merger impact enlisted development? How/Why?

a. Considerably Better
b. Better
c. No Change
d. Slightly Worse
e. Significantly Worse

Acceptance of CLR Initiatives

MM8. How favorable are you to the integration of supply and transportation functions into a single squadron? (Why?) Ref. ToO 7.5.0.

a. Very Favorable
b. Favorable
c. Neutral
d. Unfavorable
e. Very Unfavorable

MM9. How favorable are you to integrating Logistics Plans functions into the Logistics Readiness Squadron? (Why?)

a. Very Favorable
b. Favorable
c. Neutral
d. Unfavorable
e. Very Unfavorable

Summary Questions

MM10. What is your top CLR success to date?

MM11. What is your biggest CLR challenge to date?

MM12. Have there been any unexpected surprises in implementing CLR?

Opportunity to Capture Other Ideas

MM13. Is there any area of importance that you feel we did not address? And would you like to make any statements at this time?

Contingency Planning

Perceptions of Process Performance as a Result of CLR Initiatives

CP1. How has the coordination with Wing Plans been impacted as a result of the logistics plans realignment? (How?) Ref. ToO 9.1.1.

a. Considerably Better
b. Better
c. No Change
d. Slightly Worse
e. Significantly Worse

CP2. How has deployment execution been impacted as a result of the logistics plans realignment? (Why?) Ref. ToO 9.1.1.

a. Considerably Better
b. Better
c. No Change
d. Slightly Worse
e. Significantly Worse

CP3. How has management of AEF deployment taskings been impacted as a result of the realignment? (How?) Ref. ToO 9.2.0.

a. Considerably Better
b. Better
c. No Change
d. Slightly Worse
e. Significantly Worse

CP4. How has the accomplishment of Unit Deployment Manager (UDM) training and deployment augmentee training been impacted as a result of the realignment? Ref. ToO 9.1.1.

a. Considerably Better
b. Better
c. No Change
d. Slightly Worse
e. Significantly Worse

Perceptions of Officer/Enlisted Development as a Result of CLR Initiatives

CP5. How will the alignment of logistics plans within the Logistics Group impact logistics officer development? Ref. ToO 9.0.0.

a. Considerably Better
b. Better
c. No Change
d. Slightly Worse
e. Significantly Worse

CP6. Will Logistics officer development be better with logistics plans alignment in the LSS or LRS? Ref. ToO 9.0.0.

a. Logistics Support Squadron
b. Logistics Readiness Squadron

CP7. How will alignment under the Logistics Group impact development of logistics plans civilian corps? Ref. ToO 9.0.0.

a. Considerably Better
b. Better
c. No Change
d. Slightly Worse
e. Significantly Worse

CP8. How will alignment under the Logistics Group impact development of logistics plans enlisted corps? Ref. ToO 9.0.0.

a. Considerably Better
b. Better
c. No Change
d. Slightly Worse
e. Significantly Worse

Acceptance of CLR Initiatives

CP9. Are you favorable or unfavorable to the alignment of logistics plans functions under the LG? (Why?) Ref. ToO 9.0.0.

a. Very Favorable
b. Favorable
c. Neutral
d. Unfavorable
e. Very Unfavorable

CP10. For alignment under the Logistics Group, are you more favorable to alignment within the Logistics Support Squadron or the Logistics Readiness Squadron?

a. Logistics Support Squadron
b. Logistics Readiness Squadron

Summary Questions

CP11. What is your top CLR success to date?

CP12. What is your biggest CLR challenge to date?

CP13. Have there been any unexpected surprises in implementing CLR?

Opportunity to Capture Other Ideas

CP14. Is there any area of importance that you feel we did not address? And would you like to make any statements at this time?

APPENDIX E

Reporting Metrics and Quantitative Analysis Results in Sortie Production/Fleet Health

This appendix presents some of the key sortie production/fleet health metrics reported monthly by bases testing the CLR initiatives during CLR Phase 2. The test duration and environmental influences rendered many of the measures of little use, with the exception of identifying any major unexplained deviations. Some general comparisons of data submitted by test bases and MAJCOMs are presented here; and historical data are presented if they were available. Not all bases reported every metric, so some data may not be available.

Figure E.1 shows the mission capable (MC) rates for the F-15s at Langley, Kadena, and the Air Combat Command (ACC). Clearly, the September 11, 2001, attacks increased these Combat Air Force (CAF) MC rates, especially at Kadena. However, when the historical data were compared to the test period data, no significant change that could be attributed to the CLR initiatives was found.

As Figure E.2 shows, the Mobility Air Force (MAF) MC rates also increased after September 11.

Figures E.3 and E.4 show, respectively, the CAF flying schedule effectiveness (FSE) rate and maintenance scheduling effectiveness (MSE) rate during the test period. These were consistent with the trends found in the historical data when the extra strain placed on bases by the events of September 11 were taken into consideration. There were no changes in FSE or MSE significant enough to cause belief that implementing the CLR initiatives produced unintended consequences.

Figure E.1
CAF F-15 MC Rates, Aug 1999 through Feb 2002

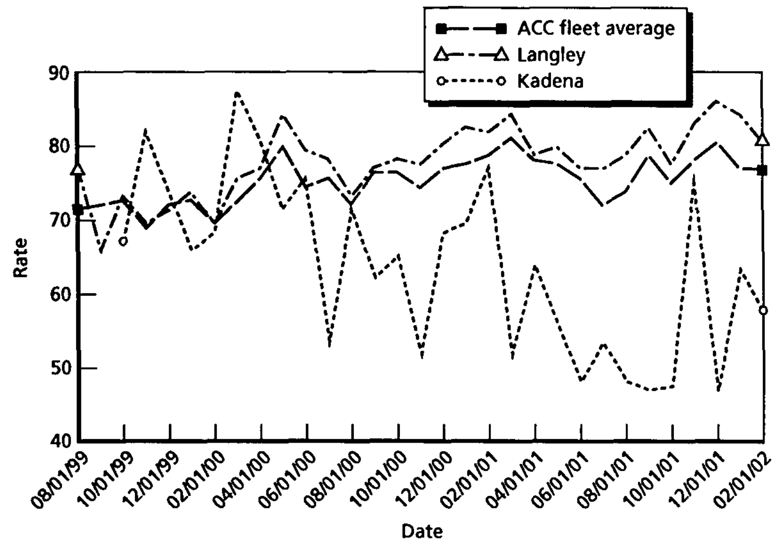

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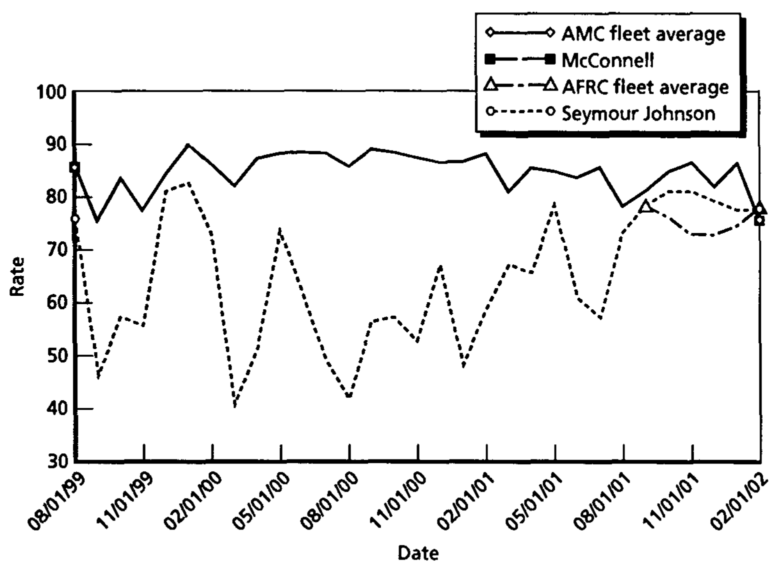
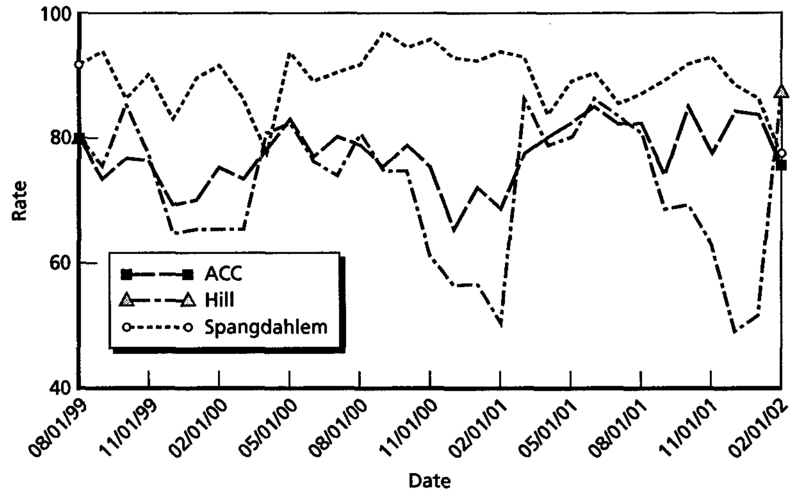
Figure E.2
MAF KC-135 MC Rates, Aug 1999 through Feb 2002



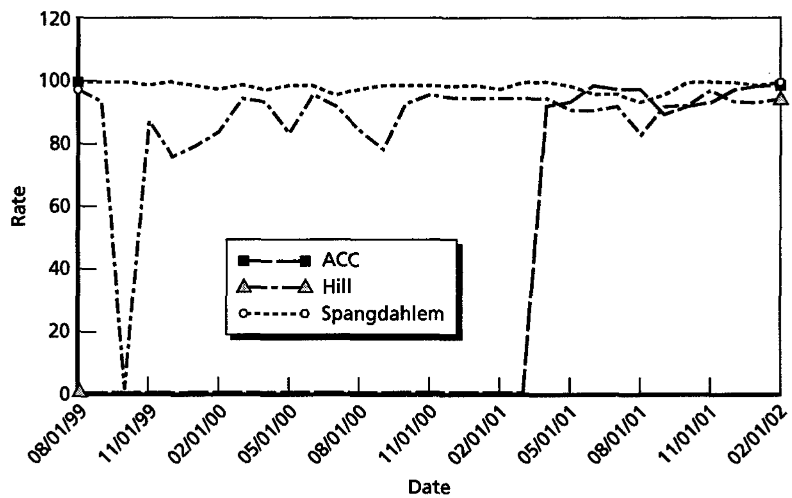
RAND MG190-E.2

Figure E.3
CAF F-16 FSE, Aug 1999 through Feb 2002



RAND *MG190-E.3*

Figure E.4
CAF F-16 MSE, Aug 1999 through Feb 2002



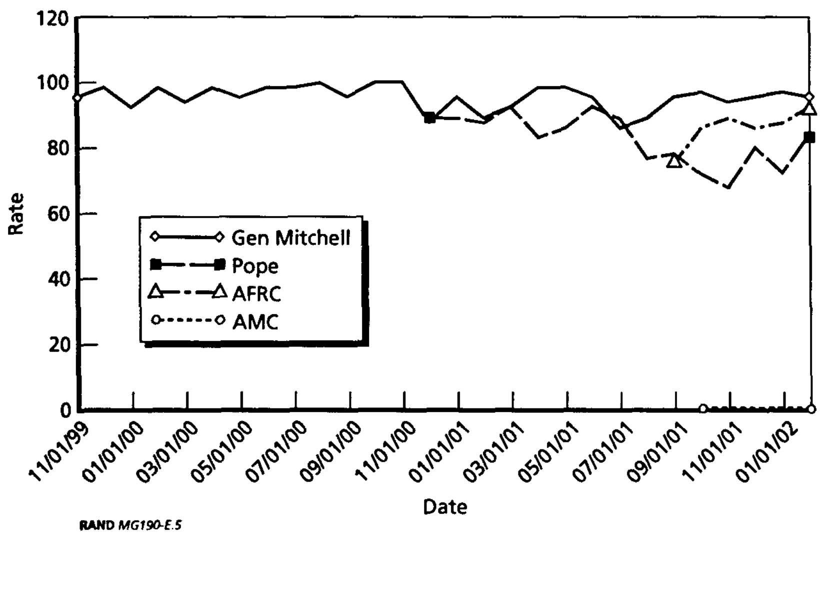
RAND *MG190-E.4*

Figures E.5 and E.6 show the FSE and MSE rates for the MAF. In this case, there was not enough historical data to compare to the test period data in order to draw conclusions. When only the test period data were compared to the data from the other test bases and the MAJCOM averages, both the FSE and the MSE rates did not appear to have been adversely affected by the CLR initiatives.

Figures E.7 and E.8 show the time distribution interval (TDI) data for the F-15 and F-16, respectively. Here, there were no historical data to compare with the current data. Based solely on the data available, there appears to have been an increase in the TDI for the F-15 and a decrease in the TDI for the F-16. Both changes are small and not statistically significant.

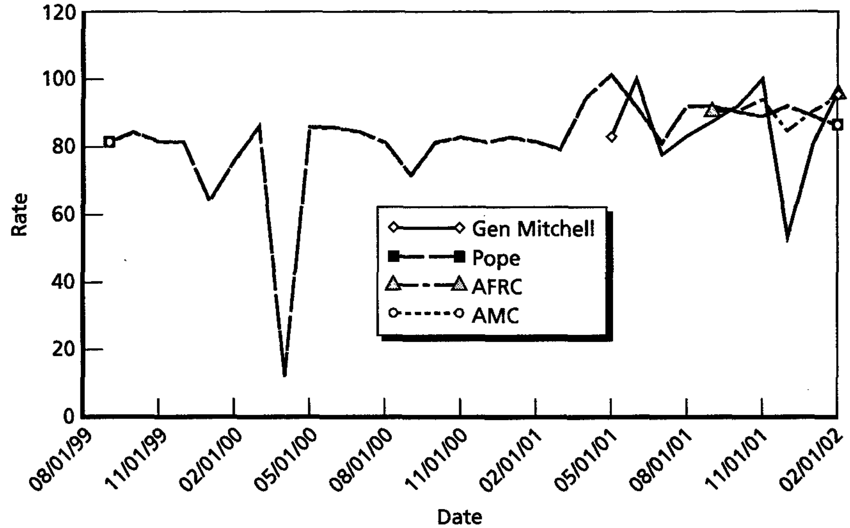
Figure E.9 shows the A-10 deferred discrepancies. Analysis is difficult in this case, as well, because there are no historical data available. Spangdahlem's rate increased, the Air Force Reserve Command (AFRC) average decreased, and Barksdale's average remained about the same. ACC did not have a fleet average available for comparison with Spangdahlem's data.

Figure E.5
MAF C-130 FSE, Nov 1999 through Feb 2002



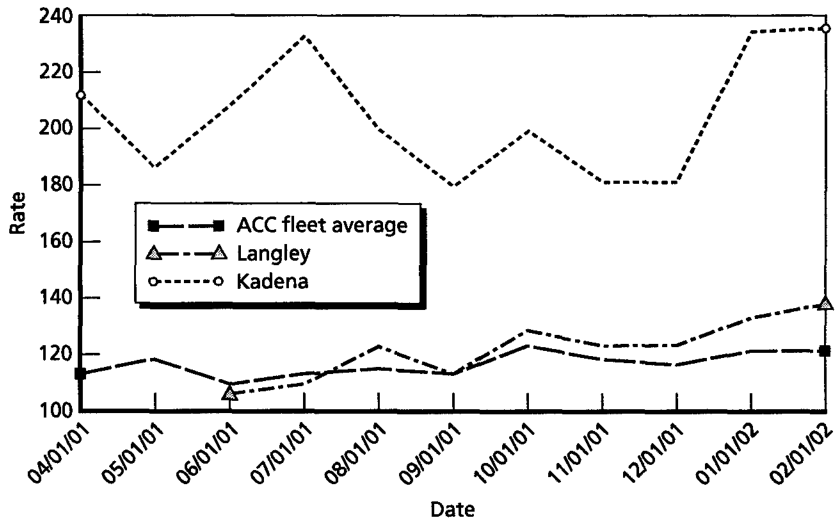
RAND MG190-E.5

Figure E.6
MAF C-130 MSE, Aug 1999 through Feb 2002



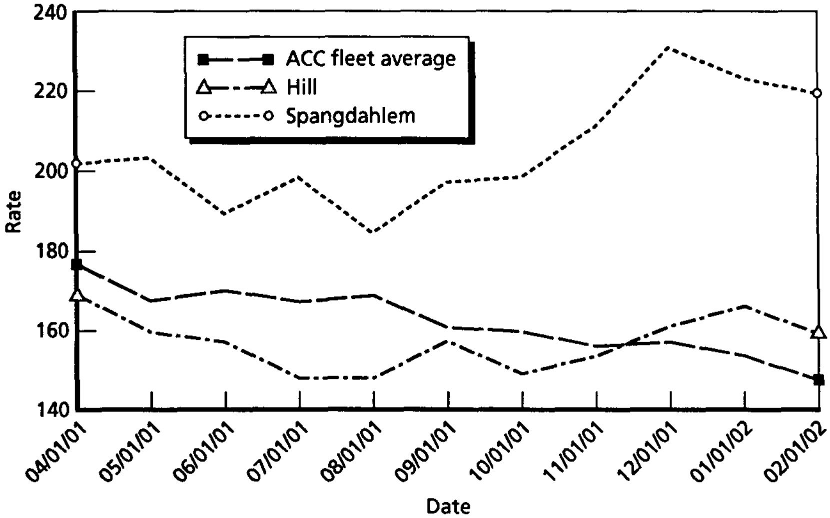
RAND *MG190-E.6*

Figure E.7
F-15 TDI, Apr 2001 through Feb 2002



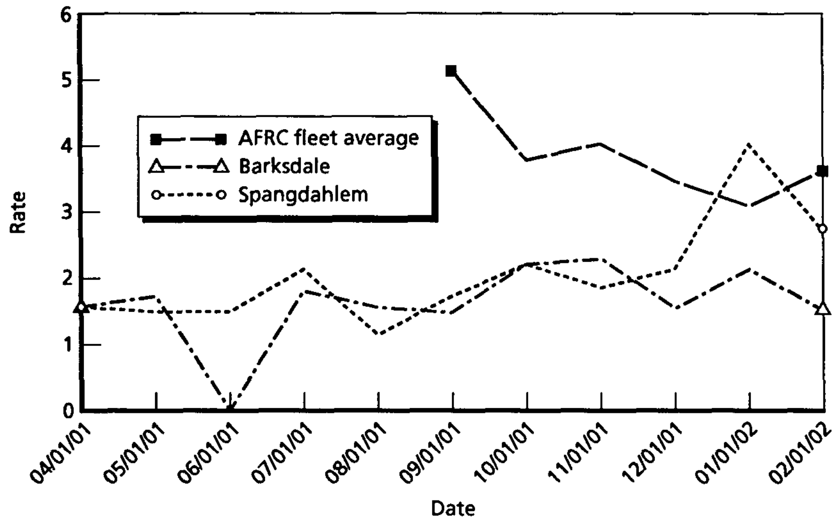
RAND *MG190-E.7*

Figure E.8
F-16 TDI, Apr 2001 through Feb 2002



RAND *MG190-E.8*

Figure E.9
A-10 Deferred Discrepancies, Apr 2001 through Feb 2002



RAND *MG190-E.9*

Looking at the data from a different perspective gave more insight into the trends. The next several graphs show the data analyzed by month and by year. Each graph contains one base or MAJCOM compared to itself during the same month in different years: 1999, 2000, and the test period. Analyzing the data in this manner allowed a comparison between yearly peaks and downtimes and what occurred during the test period. In most cases, the test period data in these graphs are consistent with or better than the data from the same time period in past years. Implementing CLR initiatives appears not to have caused any significant problems according to the monthly report data.

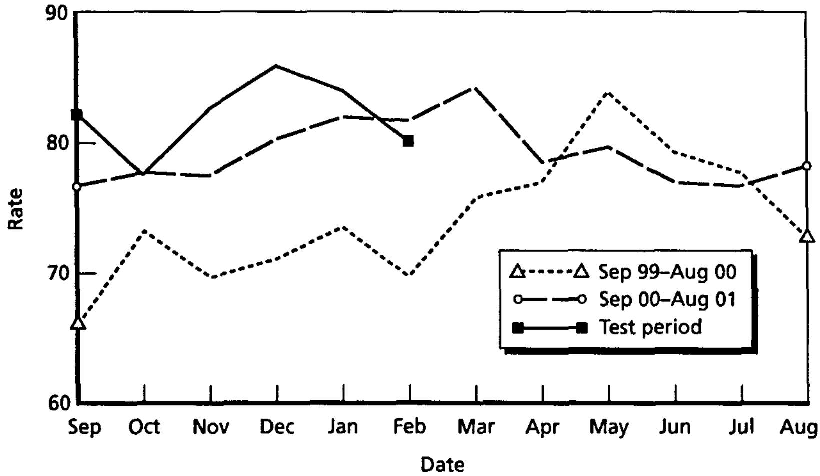
Figures E.10 and E.11 show, respectively, the Langley F-15 MC rates and FSE rates. As is evident from the first of these figures, the test period MC rates were better than the MC rates for the same time period in 1999 and 2000, although the February 2002 rate fell below the February 2001 rate. As for the FSE rates, those during the test period were better than the historical those reported for the prior two years. Viewing the data from this perspective, CLR appears to have improved the FSE rate at Langley.

Looking at Figure E.12, which shows the Langley MSE rates, the test period data can be seen to be slightly better than or approximately the same as the data for past years. There appears to have been no change to the MSE rates as a result of the CLR initiatives.

Figure E.13 shows the MAJCOM MC rates. In this case, the data for the test period are either slightly better or slightly worse than the data for in the past years. The ACC MC rate does not appear to have been affected by the CLR initiatives.

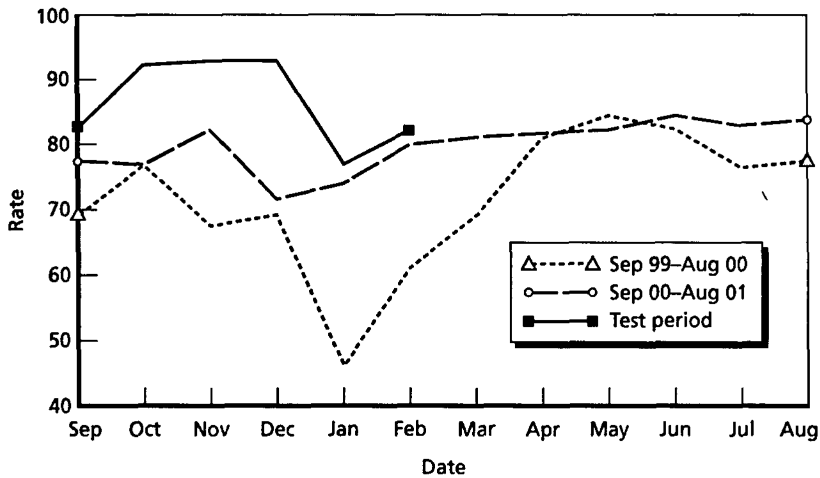
The Hill AFB MC and FSE rates are shown, respectively, in Figures E.14 and E.15. MC rates have very distinctive trends during the year, with weather playing a large role in when the aircraft get to fly. Comparing the test period MC data to the historical MC data, it is evident that the test period rates were about the same as or better than the rates in years past. Looking at the Hill AFB FSE rate, the

Figure E.10
Langley F-15 MC Rates



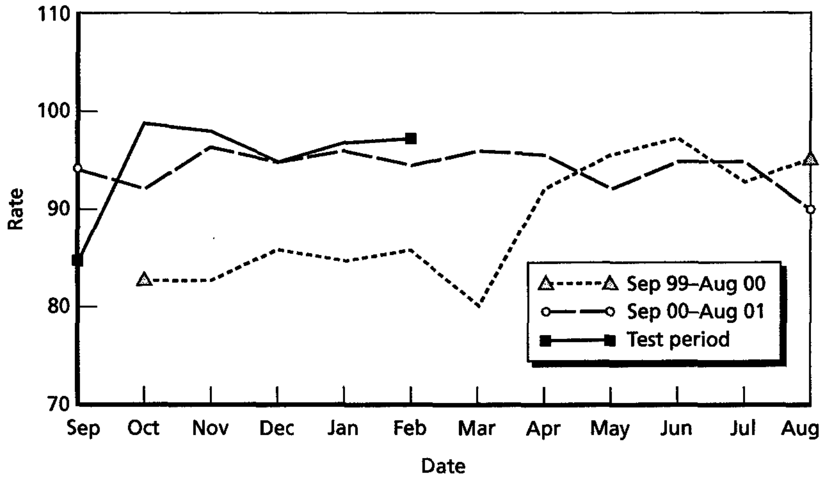
RAND MG190-E.10

Figure E.11
Langley F-15 FSE Rates



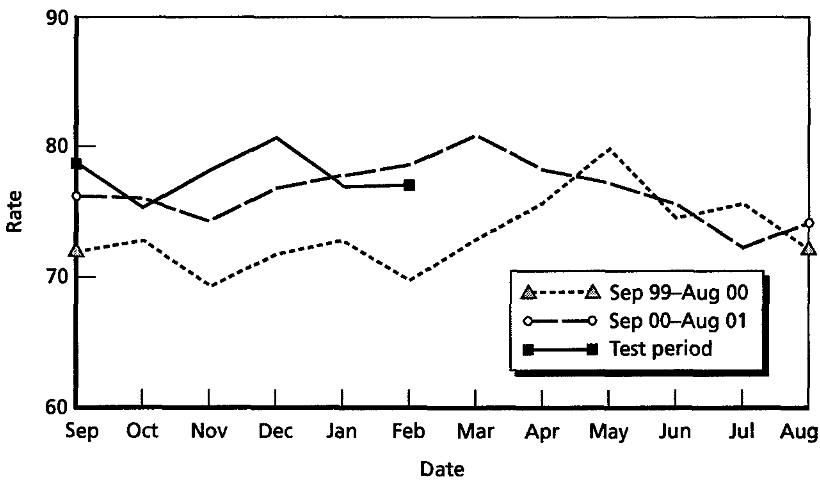
RAND MG190-E.11

Figure E.12
Langley F-15 MSE Rates



RAND *MG190-E.12*

Figure E.13
ACC F-15 MC Rates



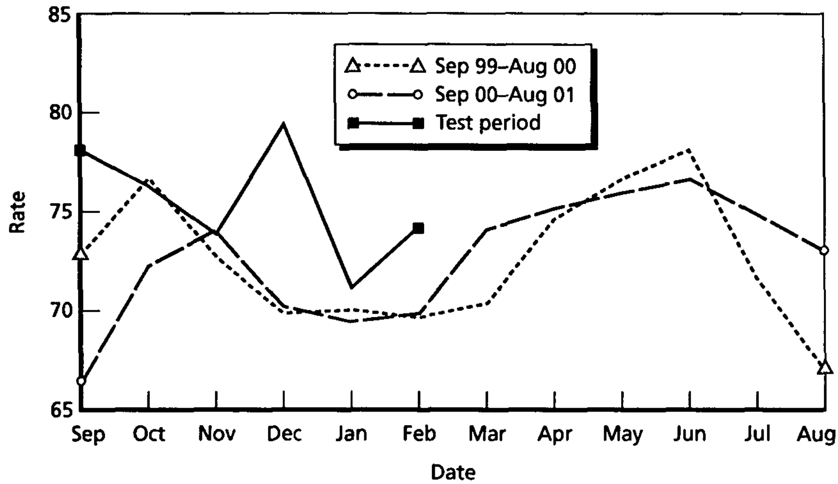
RAND *MG190-E.13*

test period data and the data from the past years can be seen to follow the same trend, but the test period FSE rate is slightly worse.

Figure E.16 shows the MSE rate at Hill AFB, which appears not to have changed significantly from the previous year.

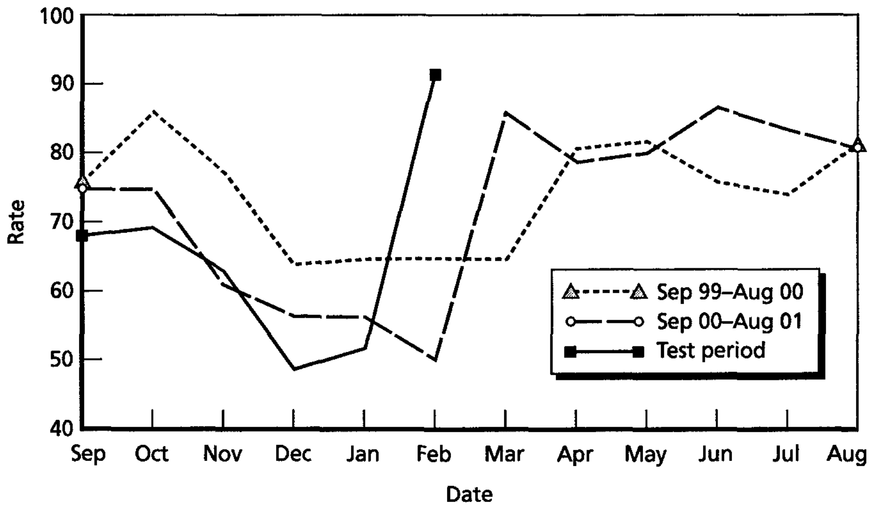
As illustrated by the data submitted in the monthly reports, CLR appears not to have caused any unintended consequences in sortie production or fleet health. The impact of September 11 cannot be factored out of the data submitted, however; so the quantitative data were of little use other than for evaluating large discrepancies between current data and historical data. In evaluating sortie production and fleet health, more emphasis was placed on the qualitative data gathered during site visits (see Chapter Four).

Figure E.14
Hill F-16 MC Rates



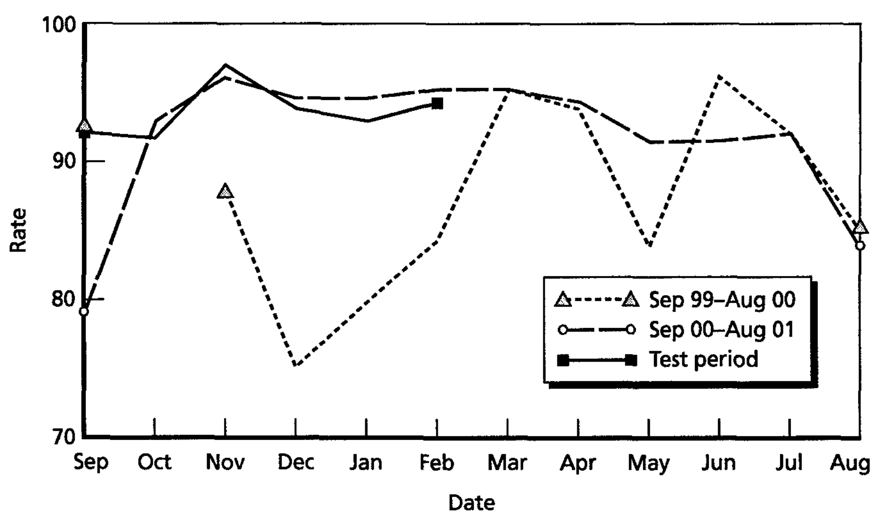
RAND MG190-E.14

Figure E.15
Hill F-16 FSE Rates



RAND *MG190-E.15*

Figure E.16
Hill F-16 MSE Rates



RAND *MG190-E.16*

APPENDIX F

Detailed Interview Data for Sortie Production/ Fleet Health

For the CLR test period, the primary initiative was to produce a better balancing of daily sortie production and long-term fleet health priorities. To produce this better balance, fleet health functions were realigned. The test temporarily moved personnel and process management from the wing (MOC) and OG (Phase, PS&D, MDSA, and QA) to the LG. In addition, a Maintenance Operations Division (MOD) was created under the LG to help facilitate the management of long-term fleet health.

This appendix presents data gathered during site visits made in support of the following key result areas (KRAs):

- Sortie production/fleet health balance (OG/LG coordination)
- MOC and resource coordination process
- Maintenance and flying scheduling
- Maintenance management (MDSA and QA)
- Maintenance corps career development (enlisted/officer)

There is a section in this appendix for each of these five KRAs. Each section presents the question or questions that were asked of the interviewees with regard to the specific KRA. Each question is followed by tables presenting the interviewees' responses (Tables F.1 through F.26). The first four sections present a set of three tables for each question. The first table lists the responses for the total population, and the second and third tables break out the responses by

Combat Air Force (CAF) and then Mobility Air Force (MAF). The final section presents two tables for its questions.

Sortie Production/Fleet Health Balance (OG/LG Coordination)

SP/FH 1. How has the realignment of MX functions under the LG impacted the balance between Sortie Production and Fleet Health? Ref. ToO 1.0.0.

SP/FH 2. How has the realignment of MOC and PS&D impacted the coordination between the OG and the LG? Ref. ToO 1.1.2/2.1.5.

Table F.1
Perception of CLR Impacting the Balance Between Long-Term Fleet Health and Near-Term Sortie Production

	Maintainers			
ALL—MAF/CAF (191)	Total (162)	In OG (44)	In LG (118)	**Operators (29)**
Better	53%	27%	63%	34%
Unchanged	41%	61%	34%	59%
Worse	6%	11%	3%	7%
Don't Know/No Opinion	0%	0%	0%	0%

Table F.2
CAF Perception of CLR Impacting the Balance Between Long-Term Fleet Health and Near-Term Sortie Production

	Maintainers			
CAF ONLY (127)	Total (106)	In OG (34)	In LG (72)	**Operators (21)**
Better	50%	23%	63%	29%
Unchanged	42%	62%	33%	62%
Worse	8%	15%	4%	9%
Don't Know/No Opinion	0%	0%	0%	0%

Table F.3
MAF Perception of CLR Impacting the Balance Between Long-Term Fleet Health and Near-Term Sortie Production

	Maintainers			
MAF ONLY (64)	Total (56)	In OG (10)	In LG (46)	**Operators (8)**
Better	59%	40%	63%	50%
Unchanged	39%	60%	35%	50%
Worse	2%	0%	2%	0%
Don't Know/No Opinion	0%	0%	0%	0%

Table F.4
Impact of MOC and PS&D Realignment on OG/LG Coordination

	Maintainers			
ALL—MAF/CAF (64)	Total (55)	In OG (9)	In LG (46)	**Operators (9)**
Better	48%	22%	52%	33%
Unchanged	36%	67%	30%	33%
Worse	11%	11%	11%	11%
Don't Know/No Opinion	5%	0%	7%	22%

Table F.5
CAF Impact of MOC and PS&D Realignment on OG/LG Coordination

	Maintainers			
CAF ONLY (34)	Total (29)	In OG (6)	In LG (23)	**Operators (5)**
Better	52%	33%	57%	20%
Unchanged	31%	50%	26%	20%
Worse	14%	17%	13%	20%
Don't Know/No Opinion	3%	0%	4%	40%

Table F.6
MAF Impact of MOC and PS&D Realignment on OG/LG Coordination

	Maintainers			
MAF ONLY (30)	Total (26)	In OG (3)	In LG (23)	**Operators (4)**
Better	42%	0%	48%	50%
Unchanged	42%	100%	35%	50%
Worse	8%	0%	8%	0%
Don't Know/No Opinion	8%	0%	8%	0%

SP/FH 11. Overall, are you favorable or unfavorable to the realignment of maintenance functions being tested in CLR?

Table F.7
Overall Acceptance of CLR Realignments

	Maintainers			
ALL—MAF/CAF (198)	Total (167)	In OG (46)	In LG (121)	**Operators (31)**
Favorable	72%	48%	82%	58%
Unchanged	14%	24%	10%	29%
Unfavorable	13%	26%	8%	13%
Don't Know/No Opinion	0.6%	2%	0%	0%

Table F.8
CAF Acceptance of CLR Realignments

	Maintainers			
CAF ONLY (130)	Total (109)	In OG (36)	In LG (73)	**Operators (21)**
Better	70%	42%	85%	43%
Unchanged	15%	30%	7%	38%
Worse	15%	28%	8%	19%
Don't Know/No Opinion	0%	0%	0%	0%

Table F.9
MAF Acceptance of CLR Realignments

	Maintainers			
MAF ONLY (68)	Total (58)	In OG (10)	In LG (48)	**Operators (10)**
Better	76%	70%	77%	90%
Unchanged	12%	0%	15%	10%
Worse	10%	20%	8%	0%
Don't Know/No Opinion	2%	10%	0%	0%

MOC and Resource Coordination Process

SP/FH 3. How has the realignment of the MOC functions impacted the capability to control, coordinate, develop priorities, and allocate resources? Ref. ToO 1.1.1.

Table F.10
Realignment of the MOC Functions' Impact on the Capability to Control, Coordinate, Develop Priorities, and Allocate Resources

	Maintainers			
ALL—MAF/CAF (171)	Total (155)	In OG (46)	In LG (109)	**Operators (16)**
Better	41%	17%	51%	6%
Unchanged	50%	72%	40%	75%
Worse	5%	7%	5%	6%
Don't Know/No Opinion	4%	4%	4%	13%

Table F.11
CAF Realignment of the MOC Functions' Impact on the Capability to Control, Coordinate, Develop Priorities, and Allocate Resources

	Maintainers			
CAF (116)	Total (103)	In OG (36)	In LG (67)	**Operators (13)**
Better	40%	17%	52%	8%
Unchanged	52%	75%	40%	76%
Worse	4%	5%	3%	8%
Don't Know/No Opinion	4%	3%	5%	8%

Table F.12
MAF Realignment of the MOC Functions' Impact on the Capability to Control, Coordinate, Develop Priorities, and Allocate Resources

	Maintainers			
MAF (55)	Total (52)	In OG (10)	In LG (42)	**Operators (3)**
Better	44%	20%	50%	0%
Unchanged	44%	60%	41%	67%
Worse	8%	10%	7%	0%
Don't Know/No Opinion	4%	10%	2%	33%

Maintenance and Flying Scheduling

SP/FH 4. How has the creation of the MOD under the LG impacted Maintenance Scheduling (FTD, Weapons Load, Phase, wash, TCTO, USM time)? Ref. ToO 1.1.2/2.1.5.

Table F.13
Realignment (MOD) Impacts on Maintenance Scheduling

	Maintainers			
ALL—MAF/CAF (170)	Total (157)	In OG (46)	In LG (111)	**Operators (13)**
Better	32%	15%	40%	23%
Unchanged	54%	72%	46%	61%
Worse	7%	11%	5%	8%
Don't Know/No Opinion	7%	2%	9%	8%

Table F.14
CAF Realignment (MOD) Impacts on Maintenance Scheduling

	Maintainers			
CAF (115)	MX Total (105)	MX in OG (36)	MX in LG (69)	**Operators (10)**
Better	38%	17%	49%	20%
Unchanged	48%	69%	36%	60%
Worse	8%	14%	6%	10%
Don't Know/No Opinion	6%	0%	9%	10%

Table F.15
MAF Realignment (MOD) Impacts on Maintenance Scheduling

	Maintainers			
MAF (55)	Total (52)	In OG (10)	In LG (42)	**Operators (3)**
Better	21%	10%	24%	33%
Unchanged	65%	80%	62%	67%
Worse	4%	0%	5%	0%
Don't Know/No Opinion	10%	10%	9%	0%

SP/FH 5. How has the creation of the MOD under the LG impacted the Daily Flying Scheduling? Ref. ToO 1.1.2/2.1.5.

Table F.16
Realignment (MOD) Impacts on Daily Flying Scheduling

	Maintainers			
ALL—MAF/CAF (168)	Total (154)	In OG (46)	In LG (108)	**Operators (14)**
Better	25%	17%	29%	14%
Unchanged	62%	76%	56%	79%
Worse	4%	4%	4%	0%
Don't Know/No Opinion	9%	2%	11%	7%

Table F.17
CAF Realignment (MOD) Impacts on Daily Flying Scheduling

	Maintainers			
CAF (113)	Total (102)	In OG (36)	In LG (66)	**Operators (11)**
Better	22%	14%	27%	0%
Unchanged	66%	83%	56%	91%
Worse	3%	3%	3%	0%
Don't Know/No Opinion	9%	0%	14%	9%

Table F.18
MAF Realignment (MOD) Impacts on Daily Flying Scheduling

	Maintainers			
MAF (55)	Total (52)	In OG (10)	In LG (42)	**Operators (3)**
Better	31%	30%	31%	67%
Unchanged	56%	50%	57%	33%
Worse	6%	10%	5%	0%
Don't Know/No Opinion	7%	10%	7%	0%

Maintenance Management (Analysis and Quality Assurance)

SP/FH 6. How has the realignment of Analysis functions impacted the use of analysis in managing and scheduling? Ref. ToO 1.2.0.

Table F.19
Analysis Use in Managing and Scheduling

	Maintainers			
ALL—MAF/CAF (142)	Total (130)	In OG (41)	In LG (89)	**Operators (12)**
Better	32%	10%	43%	33%
Unchanged	53%	73%	44%	42%
Worse	6%	7%	5%	17%
Don't Know/No Opinion	9%	10%	8%	8%

Table F.20
CAF Analysis Use in Managing and Scheduling

	Maintainers			
CAF (113)	Total (103)	In OG (36)	In LG (67)	**Operators (10)**
Better	35%	11%	48%	30%
Unchanged	49%	70%	39%	40%
Worse	8%	8%	7%	20%
Don't Know/No Opinion	8%	11%	6%	10%

Table F.21
MAF Analysis Use in Managing and Scheduling

	Maintainers			
MAF (29)	Total (27)	In OG (5)	In LG (22)	**Operators (2)**
Better	22%	0%	27%	50%
Unchanged	67%	100%	59%	50%
Worse	0%	0%	0%	0%
Don't Know/No Opinion	11%	0%	14%	0%

SP/FH 7. How has the realignment of QA enhanced Sortie Production and/or Fleet Health? Ref. ToO 1.4.4.

Table F.22
Impact of Realignment of QA on SP/FH

ALL—MAF/CAF (128)	Maintainers			Operators (12)
	Total (116)	In OG (38)	In LG (78)	
Better	22%	21%	23%	0%
Unchanged	66%	73%	63%	67%
Worse	2%	3%	1%	8%
Don't Know/No Opinion	10%	3%	13%	25%

Table F.23
CAF Impact of Realignment of QA on SP/FH

CAF (114)	Maintainers			Operators (10)
	Total (104)	In OG (36)	In LG (68)	
Better	23%	22%	24%	0%
Unchanged	65%	72%	62%	70%
Worse	2%	3%	1%	10%
Don't Know/No Opinion	10%	3%	13%	20%

Table F.24
MAF Impact of Realignment of QA on SP/FH

MAF (14)	Maintainers			Operators (2)
	Total (12)	In OG (2)	In LG (10)	
Better	17%	0%	20%	0%
Unchanged	75%	100%	70%	50%
Worse	0%	0%	0%	0%
Don't Know/No Opinion	8%	0%	10%	50%

Maintenance Corps Career Development (Enlisted/Officer)

SP/FH 9. How will the realignment of functions under the LG impact enlisted training for the affected functions? Ref. ToO 5.1.

Table F.25
Impact of Realignments on Enlisted Training

ALL—MAF/CAF (166)	Maintainers			Operators (13)
	Total (153)	In OG (46)	In LG (107)	
Better	41%	35%	43%	15%
Unchanged	47%	54%	44%	54%
Worse	7%	7%	7%	8%
Don't Know/No Opinion	5%	4%	6%	23%

SP/FH 10. How will the realignment of functions under the LG impact maintenance Officer development? Ref. ToO 10.1.

Table F.26
Impact of Realignments on Officer Development

	Maintainers						Operators (13)	
	Total (152)		In OG (46)		In LG (106)			
ALL—MAF/CAF (165)	Enlisted (106)	Officer (46)	Enlisted (33)	Officer (13)	Enlisted (73)	Officer (33)	Enlisted (0)	Officer (13)
Better	56%	63%	36%	46%	64%	70%	0%	46%
Unchanged	26%	30%	36%	54%	22%	21%	0%	23%
Worse	7%	7%	15%	0%	3%	9%	0%	23%
Don't Know/No Opinion	11%	0%	12%	0%	11%	0%	0%	8%

APPENDIX G

Maintenance Organizational Structure: A Historical Perspective

This appendix presents a brief history of the way aircraft maintenance has been organized since the early 1900s. This history should be of interest to Air Force operational and combat support leaders, as it addresses how aircraft maintenance has been reorganized over time and identifies the key drivers for making organizational changes where historical documents identify the reasons for change. Based on recent CLR field interviews, there may be occasion for reexamining the current maintenance reorganization decisions in the future. As stated earlier in this report, how maintenance is organized may be of only secondary importance if a common understanding of what it takes to balance day-to-day sortie production with long-term fleet health is achieved.

Over the years, many factors have affected the way that aircraft maintenance has been organized, including training requirements, technician skill levels, availability of personnel (manning levels), availability of spares, budgetary constraints, and technical systems reliability and maintainability. Historically, training requirements increased as aircraft complexity increased. As the manpower levels were decreased, generalist training was resumed, but only until aircraft complexity drove the need for greater specialization.

Maintenance Organization During the Early 1900s

World War I, Decentralized Maintenance

Prior to 1917, the flying squadron had evolved as the established tactical unit. The Squadron Commander was responsible for upkeep and repair of all airplanes and equipment under his command. Aviation mechanics, enlisted men of any grade, were appointed after testing. There was a basic company and section formation; officers were pilots who were also in charge of section maintenance. Aircraft were technologically unsophisticated, and enlisted personnel were experts on the entire aircraft.

At the outset of World War I (WWI), Brig Gen Maven Patrick became Chief of the Air Service and issued Memorandum No. 37, which established an Air Service Plan for the supply, salvage, and repair of airplanes. The effect of this memorandum was to establish echelons of maintenance, which would be the accepted structure and the basis for different repair levels and locations for many years. The plan called for a network of groups, mobile parks, air depots, intermediate depots, depots, acceptance fields, and production centers. The first echelon sited in the memorandum was the group, made up of squadrons, which performed aircraft and engine maintenance repairs at the local level. The group was designed to be a self-contained unit, not constrained with heavy equipment that would hinder its mobility.[1]

The rapid growth of aviation during WWI increased the need for airplane mechanics and engineering officers. By 1918, the Aero Squadron was established. The Aero Squadron consisted of four sections: headquarters, engineering, supply, and flying. Maintenance was within the engineering section. For airplanes, a repair crew was established consisting of a crew chief, an assistant crew chief, and various mechanics. The crew chief was the individual responsible for all servicing and repair of the aircraft. Soon after entry into WWI, maintenance organizations at flying fields could not handle overhauls and complicated repairs, so maintenance depots were established, central-

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[1] *Air Service Plan of Supply, Salvage, and Repair,* Memorandum No. 37, August 1918.

izing some repair. The depots were located in Dallas, TX, Montgomery, AL, and Indianapolis, IN.[2]

During the 1920s, as equipment advanced, maintenance at the squadron level improved with the introduction of aircraft record keeping (such as aircraft condition record, the record of receipt of the airplane, and daily airplane crew report). The introduction of instruments, cameras, radios, and armament—still relatively simple machines—brought about the first major specializations. Training of airplane mechanics was still very broad. The mechanic was qualified in all systems except armament, camera, and radio. This generalist training led to the establishment of a crew chief system of maintenance. The crew chief became a second-term master mechanic and a graduate of Chanute Field master mechanics courses. The crew chief and his crew members maintained the airframe, engines, controls, and accessories systems. The specialist, not assigned to the crew, maintained armament, cameras, and radios. The specialists were assigned to a service squadron or company, usually colocated on the flying field, and performed maintenance beyond the capability of the crew chief and his crew.[3]

World War II, Centralized Maintenance

By 1939, the Army Air Service was still relatively small, with an inventory of fewer than 2,000 aircraft. The Air Service's Engineering Division at McCook Field was combined with the Supply Division and the Industrial War Plans Division and moved to Wright Field, OH. This new organization was named the Material Division. It was responsible, in part, for establishing maintenance criteria, policies, and procedures, and for exercising authority over all maintenance per-

[2] Frey, Royal D., "Evolution of Maintenance Engineering", Vol. 1. Unpublished Historical Study, Air Material Command, Wright-Patterson AFB, OH, July 1960.

[3] Army Air Force, *The Air Corps System of Maintenance*, War Department Circular 65-11, Washington D.C., April 5, 1929.

formed at flying units throughout the continental United States (CONUS).[4]

Using the cumulative experience of WWI and the post-war period, the newly named Army Air Corps (AAC) gradually evolved into a new version of the echelon maintenance system. First echelon maintenance was work accomplished by the crew chief of the basic combat unit and included pre- and post-flight inspections and minor repairs and servicing. Second echelon maintenance was accomplished by the crew chief with assistance from service squadron shops and included periodic inspections, adjustments or replacement of equipment, and engine changes. Third and fourth echelon maintenance was done at subdepots and depots.[5]

The first significant effects of technology on maintenance were seen with the adoption of metal tubing and pressed metal construction. These materials required a new class of skilled mechanics to handle the welding and riveting operations. The all-metal aircraft had controls, armament, and even landing gears that were tucked away out of the slip stream to increase speed, range, and performance. Accessibility decreased, making maintenance on these systems more difficult. One other significant change concerned the method of determining aircraft overhaul. The old method of the Engineering Officer determining when the aircraft required depot overhaul finally evolved to the 1939 policy of using flying hours as the criterion.

World War II (WWII) led to enormous growth in the AAC. In maintenance, flight chiefs and line chiefs became maintenance officers overnight; apprentice mechanics became line chiefs. The demand for mechanics exceeded the supply. The course length at Chanute was reduced to get mechanics into the field sooner. The broadened crew chief training was replaced by shorter, specialized training, producing the modified crew chief system. The new system included a crew chief with a crew of airplane general and engine mechanics that were

[4] Townsend, Capt James N., *A History of Aircraft Maintenance in the Army Air Force and United States Air Force*, Research Report, Air Command and Staff College, Maxwell AFB, AL, 1978, p. 19.

[5] Ibid., p. 20.

responsible for flightline and periodic maintenance. A pool of specialists was located within the squadron to aid the ground crew. The large number of people involved in aircraft maintenance drove the need for a structured maintenance organization in the Combat Group to replace the previous years' approach of operating under each flying squadron.

Also notable during this era was that overseas theater commanders were allowed to modify or even ignore the maintenance organization structure that was mandatory in CONUS.[6] These overseas units were varied and adapted to local situations. The maintenance situation overseas was one of hard, long hours, but the outlook was generally bright, with rapid promotions, excellent parts availability, development of excellent skills, and units of high-capacity and high-quality maintenance.

The overseas operations contrasted starkly with stateside conditions, where aircraft were limited and often war-weary assets brought back from overseas, supplies were limited, and maintenance personnel were often inexperienced trainees. The stateside requirement was still one of vast amounts of flying time to train combat crews and constant recycling of trainees. These conditions prompted a high degree of specialization; teams and functional groupings of maintenance personnel were established in a dock system where hangar crews accomplished scheduled inspections in accordance with jobs that were sequenced. For each task, people were trained solely against that task. Workflow through the dock was carefully scheduled, and post-dock maintenance was developed to clean up carryover work. Engine buildup went through the same high degree of specialization. The result, organizationally, was a mandated, highly structured organization to manage these specialized assets.

A Combat Group had a commander for all group maintenance, which was done in a maintenance section headed by an engineering officer. The section was divided into two branches, a Flying Line Maintenance Branch and a Production Line Maintenance Branch,

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[6] Ibid., p. 21.

each headed by an assistant engineering officer. The Flying Line Maintenance Branch was broken into four units: one each for maintenance, servicing, armament, and communications. This branch was responsible for servicing, pre-flight, daily and 25-hour inspections, filling out forms, all contact with aircrews, replacement of aircraft and engine units (unless it would involve excessive out-of-commission time), and accomplishment of technical order changes.

The Production Line Maintenance Branch consisted of 14 units: one each for cockpit and cabin, cleaning, flight controls and surfaces, hydraulic and landing gear, engine, fuel and oil, electrical, instrument, propeller, armament, communications, metal repair, ground equipment repair, and parachute. This branch was responsible for washing and cleaning; accomplishment of 50-hour, 100-hour, and other periodic inspections; engine changes; and technical order changes beyond the capability of the flying line maintenance branch. The Production Branch also changed major assemblies; did metal repair, maintenance, and servicing of flightline and hangar equipment; and preparation of engines and aircraft for return to supply or depot.[7]

Post-WWII, Decentralized Maintenance with Centralized Control

After WWII, regulations began to be used to define maintenance organizations. These regulations reflected both previous experience and the changes brought about by differences in technology, personnel availability, and mission requirements. In August 1945, U.S. Army Strategic Air Forces published Regulation 65-1, Combat Maintenance Procedures.[8] This publication established a decentralized maintenance section with strong centralized control in the form of a Wing Maintenance Control. It also provided for a combat maintenance officer and specialized maintenance organizations, including flightline maintenance, scheduled maintenance, engine buildup, and servicing.

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[7] *Production Line Maintenance Manuals*, Patterson Field, OH, Headquarters, Army Air Force, February 15, 1944.

[8] Spitzer, Ernest W., *Readings and Seminar, Command and Management*, Vol.5: "Maintenance in the U. S. Air Force," Air Command and Staff College, Maxwell AFB, AL, December 1977, p. 328.

This regulation set the stage for post-war maintenance organizations and procedures.

Prior to the National Defense Act of 1947, which established a separate U.S. Air Force, maintenance organizations had many top-level maintainers but few skilled mechanics. A huge post-war loss of skilled mechanics, no strong enforcement of any maintenance system, and the introduction of new jet-powered aircraft in the form of the Lockheed P-80 led to these conditions. Prior to establishment of the new service, Army Air Force (AAF) Regulation 65-1, Supply and Maintenance Program of the AAF, was released as a revision to the former 65-1. This revision did little other than to call out the new terminology (organizational, field, and depot maintenance) replacing the older echelon maintenance concept. On the flightline, virtually nothing changed, because the functional organizational structure remained unaffected.

Establishment of the U.S. Air Force

A Standardized, Decentralized Maintenance Structure

Standardization of the wing and base organization under what was called the Hobson Plan was the new Air Force's first action affecting maintenance.[9] The Hobson Plan replaced the WWII combined Combat and Service Group in order to provide unity of command and to make the best use of what was a diminishing post-war personnel pool.[10] Four groups were established: the Combat Group, the Maintenance and Supply Group (M&S), the Air Base Group, and the Medical Group.[11] While organizational maintenance was placed

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[9] Townsend, p. 27.

[10] Reiter, Lt Col Thomas E., *USAF Aircraft Maintenance Organizational Structure: Where We've Been, Where We Are, What's the Future*, Research Report, Air War College, Air University, Maxwell AFB, AL, April 1988. p. 5.

[11] Borowski, Col Edmund J., *The Suitability of the USAF Aircraft Maintenance System for Total War*, Air War College, Air University, Maxwell AFB, AL, 1952, p. 49.

in the Combat Group under the flying squadron commander, field maintenance was placed under the M&S.

Because of greatly reduced flying requirements, top-heavy manning from experienced non-commissioned officers (NCOs), and the relative simplicity of aircraft after WWII, the more traditional crew chief system was largely restored. These crew chiefs managed all work on an aircraft and supervised a team of mechanics in a classic, decentralized maintenance posture. The crew chief only occasionally had to request assistance from the field maintenance (third echelon) organization.

Berlin Airlift, Centralized Maintenance

Between June 1948 and September 1949, what became known as the Berlin Airlift was conducted. Maintenance for this airlift effort was organized as described in the Hobson Plan. Lt Gen Curtis E. LeMay, Commander of United States Air Forces in Europe (USAFE) at the time, determined that the crew chief system could not be adapted to work in the around-the-clock flying situation because of the limited number of hours a person was permitted to work. He decided that the only system capable of filling the requirements was the specialized, centralized maintenance system.

Thus, specialized aircraft maintenance was again employed, this time to support the Berlin Airlift.[12] Depot support was extensively used, and a central engine buildup line was operated at Rhein Main Air Base (AB). Two 100-hour inspections were accomplished at Burtonwood Air Depot, and contractors in CONUS did 1,000-hour overhauls of C-54 aircraft.[13] The Berlin Airlift saw the first formation of a central production control at the Combined Airlift Task Force (CATF) Headquarters at Rhein Main. The central production control for airlift forces was established to monitor maintenance status, location, supply status, and other related maintenance data for all

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[12] Fry, Col Richard J., *Aircraft Maintenance, A Limiting Factor in the Strategic Air Command*, Air War College, Maxwell AFB, AL, 1957, p.7.

[13] *Berlin Airlift, A USAFE Summary*, June 26, 1948—September 30, 1949, unpublished resume of Berlin Airlift, United States Air Forces in Europe, pp. 16–17.

CATF aircraft. The consolidated control center scheduled all work for Burtonwood and CONUS with all lift bases.[14] An electronics squadron was formed, located in Berlin, to repair C-54 radio and radar components. The Berlin Airlift adapted the existing maintenance system, centralizing control, specialist maintenance centers, and extensive depot assistance. Another important adaptation was in the role of top-level command (leadership) in advocating or mandating major command (MAJCOM) or Air Force maintenance policy.

The 1950s, A Variety of Maintenance Organizations

General LeMay became Commander of the Strategic Air Command (SAC) in late 1949. Shortly after, SAC adopted a more specialized maintenance concept. SAC Regulation (SACR) 66-12, Maintenance Management, was written to "establish a functional aircraft maintenance organization within the wing/base organization which would ensure full utilization of personnel and facilities to produce maximum availability of aircraft."[15] This required organizational change marked the first formal move toward centralized maintenance in the Air Force. The M&S Group was disbanded, and three maintenance production squadrons were established: the Field Maintenance Squadron (FMS), Periodic Maintenance Squadron (PMS), and Electronic Maintenance Squadron. The organizational maintenance capability was retained in the operational flying squadron in the Combat Group.[16] The main agency in this new structure was the wing maintenance control, which was responsible for the centralized direction and control of the wing's maintenance effort.

Other MAJCOMs were experimenting with different maintenance organizations during this period. Most retained the M&S Group and were based on the crew chief being supported by specialists where organizational maintenance was under the operational

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[14] Ibid.

[15] Townsend, p. 28.

[16] Borowski, p. 51.

squadron commander.[17] The exception was Air Training Command (ATC), where the Organizational Maintenance Squadron (OMS) was under the M&S Group commander because of ATC's limited mobility requirements. In SAC and Tactical Air Command (TAC), when units deployed they included specialists from the M&S Group in order to be a self-sufficient deployed organization. The Military Air Transport Service (MATS) used a variation of specialized maintenance. All commands faced skilled personnel shortages.

In June 1950, the North Koreans invaded South Korea, and the United States was again involved in an armed conflict. The standard M&S system in-place at the time, and even SAC's version under SACR 66-12, was not suitable for meeting mission requirements, largely because of inadequate forward-based facilities from which to conduct maintenance operations. Consequently, a system of rear-echelon maintenance bases in Japan and Korea evolved. Combined with the rear units, these rear-echelon maintenance bases were known as Rear Echelon Maintenance Combined Operations (REMCOs).[18]

Crew chiefs at forward bases, with their crews, performed preflights, turnarounds, battle damage repair, preparation for one-time flight to rear bases, and armament maintenance. Maintenance at these forward locations was limited to the quick-turnaround type of work aimed at keeping a maximum number of aircraft airworthy. The inability to achieve base self-sufficiency at forward locations made the REMCO adaptation necessary.

In 1953, ATC moved closer to centralized maintenance by forming periodic squadrons and placing all specialists in the field maintenance and armament sections. Also, planning and scheduling was moved to the chief of maintenance level; quality control was expanded, and dispatch of all specialists was accomplished by maintenance control.

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[17] Townsend, p. 32.

[18] Nelson, Carl G., "REMCO: A Korean War Development, Air War in Korea," Vol. VIII, *Air University Quarterly Review*, Vol. VI, No. 2, Summer 1953, pp. 78–85.

About this time, Air Defense Command (ADC) was having considerable trouble maintaining the new F-86D aircraft with its airborne radar and Integrated Electronic Fuel System Control. To counter the problem, ADC relied on specialists given more extensive training and improved specialized technical orders and instructions. The result was reduced accident rates and higher aircraft availability for the F-86D.[19] This concept of breaking out aircraft systems into functional areas with each area maintained by its own specialist was eventually approved by the Air Staff and continuously expanded as newer aircraft and significantly more-complex systems were introduced into the inventory.

Also in 1953, the Air Force Inspector General (IG) began to question whether the montage of different maintenance concepts among MAJCOMs was serving the best interest of the Air Force. In a landmark semiannual report to the Chief of Staff he pointed out:

> As a result of over one hundred (100) inspections, both readiness and technical, conducted by this office, it was determined that no universally effective specialized and standardized system of aircraft maintenance existed in the Air Force. The one notable exception is the Strategic Air Command, which has made a concerted effort to achieve a modern concept of maintenance and was experiencing excellent results in the conservation of skills, tools, facilities, and materials. Other commands, however, were employing various methods and systems of aircraft maintenance largely at the discretion of local commanders and maintenance officers.[20]

In December 1953, the Air Force published Air Force Regulation (AFR) 66-1, Maintenance Engineering. It was the first AFR dealing with maintenance management. Only four pages in length, it defined three levels of maintenance (organizational, field, and depot). It temporarily gave MAJCOMs authority to tailor maintenance orga-

[19] Townsend, p. 35.

[20] Fry, p. 9.

nizations to suit their missions and types of aircraft. But it issued this caveat:

> Frequent re-examination of the Air Force maintenance structure will be made to assure that organizations, facilities, equipment, and specialists are available and fully able to meet the support requirements of newly introduced items of equipment or weapon systems.[21]

In early 1955, the Air Staff initiated a study at Dover AFB, a large MATS flying wing. Conducted by an Air Force management engineering team, the study proposed that organizational maintenance be removed from the operational flying squadron and consolidated with field maintenance under a wing chief of maintenance.[22] After nine years as a service, the Air Force published definitive guidance on maintenance organizational structure on September 1, 1956. That guidance, in Air Force Manual (AFM) 66-1, Maintenance Management, was patterned after SACR 66-12 and incorporated the basic guidelines of AFR 66-1 and its revisions.

AFM 66-1, Centralized Maintenance

AFM 66-1 established a chief of maintenance responsible for all aircraft maintenance in the wing and reporting directly to the wing commander. The chief of maintenance was assisted by a staff to help in central control of all maintenance activity. Three squadrons worked directly for and reported to the chief of maintenance: the Organization Maintenance Squadron (OMS), Field Maintenance Squadron (FMS), and Electronic Maintenance Squadron. The actual organizational structure was not new; it was a formalized version of existing structures. The manual set Air Force standards, goals, and objectives for maintenance, which included aircraft in-commission

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[21] *Maintenance Engineering*, Air Force Regulation 66-1, Department of the Air Force, Washington D.C., 30 December 1953, p. 1.

[22] Benjamin, Capt George D., *An Analysis of Aircraft Maintenance Management Within Air Weather Service*, Research Study, Air Command and Staff College, Air University, Maxwell AFB, AL, 1965, p. 11.

rates, component repair standards, and aircraft scheduling objectives, among many others. It also established the requirement for man-hour accounting and maintenance data collection, a major initiative.

When AFM 66-1 was first published, implementation was a MAJCOM option. It met with numerous objections and, other than in SAC, only perfunctory compliance. Operational flying squadron commanders were leery of the "new and yet unproven system."[23] The centralized control aspect of AFM 66-1 meant to many that organizational maintenance would be taken out from under operations control. Centralized control of maintenance had the support of Air Force Chief of Staff Gen Thomas D. White, however, and he made it mandatory for all Air Force organizations in 1958.[24]

All commands began to use AFM 66-1 as directed in the 1960s. The increasing complexity of aircraft and the need for greater specialization saw more acceptance of centralized maintenance. Crew chiefs assigned to OMS worked on the flightline assisted by other OMS (airplane general) resources. All other specialist personnel were assigned to either FMS or the Electronic Maintenance Squadron and later to Armament and Electronics (A&E) Squadrons and to Munitions Maintenance Squadrons (MMSs). These specialist personnel were located off the flightline and were dispatched to assist crew chiefs as necessary, requiring communications and coordination through job control (chief of maintenance staff personnel), which in turn required paperwork and documentation. This process involved high numbers of overhead personnel, who were not directly involved in sortie generation on the flightline.[25]

Complex systems introduced with century series aircraft (particularly F-101, F-102, and F-106 aircraft) assigned to the Air De-

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[23] Foss, Lt Col Thomas P., *The Logistics of Waging War*, Gunter Air Force Station, AL; Air Force Logistics Management Center, 1983, p. 151.

[24] Benjamin, p. 12.

[25] Davis, Capt Wesley C., and Capt Sanford Walker, "A Comparison of Aircraft Maintenance Organizational Structures," Master's Thesis, AFIT/GLM/LSM/925-16, School of Systems and Logistics, Air Force Institute of Technology, Air University, Wright-Patterson AFB, OH, September 1992, p. 126.

fense Command, and similarly complex systems on SAC bombers, drove the development of large numbers of specialists, particularly in avionics squadrons and, to a lesser extent, MMSs. Systems aboard these modern fighter and bomber aircraft were so numerous and complex that technical schools generally required 52 weeks to complete technician training. Even then, further on-the-job (OJT) and field training detachment (FTD) training was required once the technician arrived at his assigned unit. Systems often failed and repairs were lengthy. Only through specialist pools (mixtures of personnel with back-shop experience and personnel with on-equipment experience) could demands be met.

When new weapons systems were brought into the inventory, large cadres of technical representatives, many of them engineers, were provided by the prime and original equipment manufacturers. These technical representatives were used both for training and hands-on maintenance and had priority access to their firms' technical staffs.

Indeed, these factors combined with others to produce high Air Force tactical fighter mission capability (MC) rates through the 1960s. Contractor technical representatives were embedded in maintenance organizations, and a large number of them were assigned across CONUS and Southeast Asia (SEA) units. Funding was readily available for SEA operations. The quality of both officer and enlisted training improved, and course durations increased. The senior workforce and management experience increased. The Air Force F-4 Phantom series aircraft was relatively new.

Vietnam Conflict, Decentralizing Trend

AFM 66-1 was practical for all MAJCOMs and gained general acceptance, but it was seriously tested, particularly in TAC, during the Vietnam era. Depending on existing manning levels, deployments may have made it difficult to cover specialist support requirements. Early deployments of smaller units (squadrons) to participate in the Vietnam conflict had austere manning, creating maintenance deficiencies and long hours of work. But temporary duty gave way to permanent change of station (PCS) assignments, and squadrons often deployed with the same personnel assigned to them at home stations. The Air Force placed flightline maintenance back into the tactical squadrons under operations. Personnel were identified with squadrons in CONUS so that peacetime work integrity would be maintained when deployed.

In the Pacific Air Force (PACAF), PACAF Regulation 66-12 was issued. This regulation realigned the OMS maintenance officer administratively to the flying squadron but left him working for the chief of maintenance. The flying squadron commander thus rated OMS personnel even though they functionally worked for the chief of maintenance.

In 1966, TAC published TAC Manual (TACM) 66-31, instituting what was known as "TAC Enhancement." Flightline personnel moved from OMS into the tactical flying squadrons. Munitions load crews were likewise moved; phase was moved into the flying squadron from FMS, and some specialist support was placed into the flying squadron for limited on-aircraft work, primarily removal and replacement of components.[26]

The new program was described in *TAC Attack* as an

> interim reorganization (which) will enhance the efficiency of maintenance functions within deployed and dispersed units . . . from the moment they deploy. Continuity of supervision will not be interrupted. Squadrons will be better able to cope with the unavoidable problems of dislocations. Overall, decentralization will improve the capability of TAC's fight and reconnaissance squadrons to continue their worldwide mission.[27]

A little more than one year after General LeMay retired as CSAF, the tactical fighter community returned to decentralized maintenance.

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[26] U.S. Air Force, *Maintenance Management*, Tactical Air Command Manual 66-31, Headquarters, Tactical Air Command, Langley Air Force Base, VA, August 1966.

[27] Slaunwhite, Ronald G., "Squadron Maintenance," *TAC Attack*, August 1966, p. 13.

The Early 1970s, Downsizing and Centralizing

Budgetary cuts accompanied the phasing down of military involvement in SEA. The duplication of resources resulting from TACM 66-31 could no longer be supported. By 1972, the number of Air Force personnel had dropped to its lowest since 1950, a 16 percent reduction just since 1966.[28]

Declines in MC rates for tactical fighters were related more to manpower reductions, skill level reductions, the introduction of complex new weapon systems (as with the F-111 series), increased problems with maintaining F-4 aircraft (now getting older), and spares reductions rather than to organizational structure. The move back to centralized maintenance became necessary to deal with the declining specialist availability and skill levels. The declining MC rates for these aircraft continued to grow despite the change back to the centralization that had earlier produced higher capability rates.

Studies done in USAFE showed that the F-4 aircraft was incapable of being turned fully mission capable (FMC) on a daily basis.[29] This was primarily because of the declining mean time between failure (MTBF) of F-4 systems and subsystems. Similar problems with the F-111 are also well documented. There were enough F-4s to meet peacetime training requirements, but not enough to generate the sortie surge requirements predicted under the War Mobilization Plan (WMP). It could be argued that no form of organization would have made a difference in maintaining these complex and low-reliability weapons systems.

On August 1, 1972, the Air Force published a major revision to AFM66-1 that greatly expanded maintenance guidance. The new manual consisted of ten volumes that covered every detail of Air Force maintenance, including that for aircraft, missiles, and communications equipment.

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[28] "USAF Personnel Strength—1907 Through 1968," *Air Force Magazine*, May 1987, p. 79.

[29] Bennett, Maj Logan J., *3.0: A Look at Constraints on Achieving Three Turns (Daily) Using F-4 Aircraft*, Briefing for CINCUSAFE, DCS/Logistics, 1974.

In the foreword of the new AFM 66-1, CSAF Gen John D. Ryan said:

> Economy in the use of resources can only be achieved by balancing operational requirements and maintenance capability. This requires planning and comprehensive scheduling of equipment maintenance. Management effectiveness can then be measured in terms of maintenance accomplishments.[30]

The new manual emphasized "making equipment available for maintenance when the resources are available." Lt Col Reiter noted in his Air War College thesis that "this was a significant philosophical change because in the past maintenance was performed whenever the aircraft were not on the flying schedule and the new policy basically called for the aircraft to be on the flying schedule whenever they were not required to be in maintenance."[31] This marked the first time such definitive guidance had been given from such a high level. General Ryan's comments on balancing requirements in operations and maintenance and his measures of merit do not imply an organizational structure.

The strict adherence to a rigid program of reporting and documenting maintenance actions, the establishment of MAJCOM evaluation teams to ensure compliance, and rigorous IG inspections and operational readiness inspections (ORIs) seemed to provide a clear message that the years of flexibility in the area of maintenance organizational structure were over. This standard manual and its organization were the final authority and discouraged further innovation.

In USAFE, from 1971 to 1974, Gen David C. Jones, Commander in Chief, USAFE, set several initiatives in motion that would have a broad impact on maintenance organization in the future. General Jones became concerned with more-effective use of USAFE re-

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[30] U.S. Air Force, *Maintenance Management,* Air Force Manual 66-1, Vol. 2, "Chief of Maintenance (Aircraft and Missile)," Washington D.C., August 1, 1972, Foreword.

[31] Reiter, p. 18.

sources.[32] USAFE's Project Streamline evaluated extensive initiatives, including cross-utilization training of maintenance personnel. A separate initiative, briefed to General Jones prior to his reassignment as Air Force Chief of Staff, dealt with centralizing maintenance even further and called for centralized intermediate repair facilities (CIRFs) to support forward base operations in wartime to reduce airlift requirements and logistics footprint.

The USAFE Vice-Commander, Lt Gen Louis Wilson, was reassigned to PACAF to take over as CINCPACAF. He asked for a staff paper that he would use to implement the CIRF concept at Kadena AB. General Jones, then CSAF, established the Maintenance Posture Improvement Program (MPIP) in 1976 to "find new ways of going about the complicated business of maintenance which would permit more efficient and effective use of the total Air Force maintenance resources."[33] The CIRF project studies were included as part of the MPIP. The proposal in USAFE and the CIRF activities within PACAF to centralize intermediate maintenance became widely known. While there was basic CSAF agreement to continue to pursue the feasibility of the proposed centralization where applicable, the proposal met with significant opposition, particularly among proponents of base self-sufficiency and particularly within TAC.

To respond to MPIP and likewise respond to USAFE and PACAF centralized maintenance initiatives, TAC proposed and tested a new base-level maintenance organization called the Production Oriented Maintenance Organization (POMO).

The Mid-1970s, POMO and Decentralized Execution with Central Control

POMO was designed from lessons learned from the Israeli Air Force (IAF) during the 1973 Arab-Israeli war (Yom Kippur). The IAF was able to generate high sortie rates by cross-utilizing skills of personnel

[32] Project Streamline, HQ USAFE, DCS/Logistics, Directorate of Maintenance, November 1973.

[33] Nelson, Maj Gen William R., "POMO—A New Concept," *Aerospace Safety*, March 1977, p. 3.

and assigning them to a flightline organization where they were directly responsible for repairing, servicing, and launching aircraft. People not directly contributing to generating aircraft were assigned to back shops. A TAC team sent to Israel felt the Israeli system of maintenance "appeared to have great possibilities in the fighter environment," where "rapid aircraft turnaround, sortie generation, and surge capability were essential."[34] Under POMO, specialists from the electronic maintenance squadron, FMS, and MMS were assigned directly to the flightline and placed in the same squadron as aircraft generalist crew chiefs or airframe and powerplant generalists.

The resulting squadron was named the Aircraft Generation Squadron (AGS) instead of OMS because it was now able to handle all on-equipment maintenance. The AGS consisted of aircraft maintenance units (AMUs), which were aligned respectively with flying squadrons. In some cases, weapons load crews were also assigned to AGS as weapons maintenance units (WMUs). The remaining specialists were grouped in two new squadrons—the Equipment Maintenance Squadron (EMS) and the Component Repair Squadron (CRS)—and performed all off-equipment maintenance. The POMO is often described as decentralized execution with centralized control, because the chief of maintenance and his staff remained the same and maintenance/job control continued to control the entire maintenance effort.

During this time, the F-111 ushered in a new flightline remove-and-replace (2R) era of maintenance, which meant fewer specialists were required for on-equipment maintenance. This move to 2R maintenance also resulted in less-detailed technical training for many specialists. Now aircraft began to incorporate self-test/built-in-test (ST/BIT) features that eliminated the more detailed on-equipment troubleshooting seen in the past. With the introduction of avionics intermediate shops (AIS) and modular engine components, on-equipment maintenance became less specialized.

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[34] Beu, Maj Norman J., and Maj Richard C. Nichols, *More Maintenance in OMS*, Research Study, Air Command and Staff College, Air University, Maxwell AFB, AL, May 1977, p. 78.

Upon implementation, the POMO structure did not increase sortie production as expected. One comprehensive study found that POMO "has had little if any, positive effect on aircraft maintenance in a peacetime operating environment".[35] The study found strong indications that POMO had caused some degradation in aircraft maintenance performance. It stated in its discussion of implications for management that "if the Air Force wants increased productivity, then one or all of the components of maintenance efficiency must be improved" and that "organizational efficiency has in many cases only a limited impact on the overall efficiency of a maintenance action when compared to what is embodied in the sequence of tasks required in the maintenance action itself."[36]

The Late 1970s and 1980s, Increased Decentralized Execution, Less Centralized Control

When Gen W. L. Creech took command of TAC in 1978, he ordered his own study. It found that sortie production had fallen 7.8 percent from 1969 to 1978 and concluded that this decline was attributable not to external factors but simply to maintenance's inability to produce the required sorties.[37] The new TAC commander felt the organization of maintenance was a major factor in this decline and led TAC to create the Combat Oriented Maintenance Organization (COMO), formalized under TAC Regulation (TACR) 66-5.

TACR 66-5 differed from POMO in many ways. Each squadron/AMU now performed its own scheduling and was responsible for its own utilization (UTE) rate. Each squadron/AMU had its own

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[35] Foster, Capt Dwight J., and Capt John C. Olsen, "A Comparative Evaluation of the Effects of the Implementation of the Production Oriented Maintenance Organization (POMO) on Aircraft Maintenance," Master's Thesis, LSSR 27-785, School of Systems and Logistics, Air Force Institute of Technology, Air University, Wright-Patterson AFB, OH, September 1978.

[36] Ibid., p. 110.

[37] Harris, Capt Barbara L., "Challenges to United States Tactical Air Force Aircraft Maintenance Personnel," Master's Thesis, AFIT/GLM/LSM/915-28, School of Systems and Logistics, Air Force Institute of Technology, Air University, Wright-Patterson AFB, OH, September 1991, pp. 19–20.

dedicated analyst. Supply was decentralized to each AMU, and the wing-level maintenance supply liaison (MSL) was eliminated. Each squadron/AMU performed its own debriefing, had its own pool of AGE, and dispatched its own flightline personnel to jobs. And dedicated crew chiefs were assigned to aircraft. The deputy commander for maintenance (DCM) remained responsible for all maintenance and reported to the wing commander. Maintenance control now "coordinated" maintenance activities more than it "controlled" maintenance. COMO also proved to be very manpower intensive.

The MC rates for tactical fighters continued to increase. One report declared: "The results of the transition to COMO have been dramatic. Sortie production, from the third quarter of 1978 to 1983, rose at an annual rate of 11.2%. In the first full year under COMO, 1979, TAC flew all of its programmed sorties for the first time in a decade."[38]

In 1990, the MC rates increased to an all-time high of 88.4 percent. When considering the increased sortie rates reported by TAC between 1978 and 1983 and beyond, however, consideration also needs to be given to the fact that the period also saw a changeover to more-modern and more-reliable tactical aircraft, better technical data through the introduction of job procedural aids and guides (JPAs/JPGs), better automatic test equipment, and more accessibility and maintainability considerations because of lessons learned from F-4 and F-111 problems. All could have had an impact on the increased MC rates.

Interviews with senior maintenance officers indicated that the senior management workforce during the changes to COMO had considerable experience and careful career management. The rated supplement, which had existed in the 1950s and 1960s, and the maintenance officer career fields both had specialized career management through the Military Personnel Center. The rated supplement had its own branch, and Palace Log was established within the officer management division, both carefully managing individual careers and

[38] Harris, p. 150.

tracking high performers and assisting them to grow into commander's jobs and DCMs. Palace Log often took in first assignment instructor pilots who had finished their tour teaching new pilots and could find no open cockpit slots. They were then placed in maintenance and became advocates of maintenance as they progressed through their rated careers.

In addition, there was consensus among the senior maintenance managers interviewed that during COMO, there was a highly trained professional maintenance workforce backed up by senior technicians who had considerable skill in the older mission design series that would soon be replaced by newer, more-reliable, and easier-to-maintain tactical aircraft. These professional maintainers saw COMO as more effective than but perhaps not as efficient as the previous, centralized maintenance. It is also important to understand that the transition from POMO to COMO was not a major reorganization but, instead, a realignment of responsibilities and functions.

The Early 1990s, MAJCOM Specific Maintenance Organizations

MAJCOMs in 1990 were largely operating in modes acceptable to each while still pursuing optimal maintenance concepts more suited to ever-changing operational requirements. TAF MAJCOMs had finally adapted COMO to their requirements. SAC formally implemented a decentralized structure in 1987, the implementing directive being SAC Regulation 66-14: Readiness Oriented Logistics System (ROLS) Maintenance Management General Policy, and Deputy Commander for Maintenance (DCM) Staff Activities. ROLS was similar to COMO and obviously influenced by it, but AFM 66-1 was still visible.[39] The Military Airlift Command (MAC), the most consistent of the MAJCOMs in terms of maintenance organizational structure, remained committed to centralized maintenance; its implementing directive was MAC Regulation 66-1, Maintenance Management Policy.[40]

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[39] Reiter, p. 30.

[40] Ibid., p. 26.

When Desert Shield/Desert Storm occurred,

> maintenance organizations were to be aligned under AFM 66-1 procedures. . . . The CENTAF/LGM was a staff advisor to deployed wings. Each base installation having more than one wing would have a lead unit DCM who would then appoint senior tenant wing maintenance officers as assistant DCMs. Collocated units were to be prepared to form joint maintenance operations centers (JMOCs) and job control (JC) units.[41]

In fact, each MAJCOM maintained aircraft in accordance with its peacetime organizations.

The one notable difference from tactical fighter support in peacetime was the establishment of CIRFs out of theater (in USAFE or at home bases) for avionics (except electronic countermeasure [ECM] pods) and engine maintenance.[42] In part, the acceptance of centralized intermediate maintenance was driven by a compromise between the need to limit population in the area of responsibility and the desire for self-sufficiency. There was concern that lines of communication would be interrupted if intermediate maintenance were out of the area of responsibility, but this concern gave way in part to the limited number of people the theater could support.[43]

One other major maintenance variation occurred with the establishment of the 7440th Composite Wing (Proven Force) consisting of ten different mission design series (MDS) aircraft. The wing established seven aircraft maintenance units (one for each flying squadron), a combined/component maintenance/equipment maintenance section, and an ammunition branch out of the 39th Consolidated Aircraft Maintenance Squadron and deployed USAFE units. The official history of Proven Force states that monitoring of the parts flow was highly effective but was also cumbersome and manpower intensive, requiring manual tracing of as many as 500 pieces of

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[41] Cohen, Dr. Eliot A. (Director), *Gulf Air War Power Survey, Vol. III, Logistics and Support*, Department of the Air Force, DS79.724.U6G95, 1993, p. 61.

[42] Ibid., p. 308.

[43] Ibid., p. 311.

cargo each day. Proven Force MC rates were approximately the same as those for peacetime and similar models of aircraft.[44]

The Mid- and Late-1990s, Objective Wing Decentralized Structure

When Gen Merrill McPeak ordered the change to the Objective Wing, he was issuing a major change to the Combat Air Force (CAF), although the Objective Wing was an effort to standardize organizations across all commands in the Air Force. This standardization effort, which applied to all Air Force wings, was based on General McPeak's description as "one base, one wing, one commander."[45] It was intended (again) that Air Force wings should train as they fight. It accomplished this by having a single wing commander at each base, with flight crews and flightline maintenance personnel working for the flying squadron commander, who reports to the Operations Group (OG) commander. The back-shop maintenance, supply, and transportation personnel would work for a Logistics Group (LG) commander.

Some variations were made to this basic Objective Wing structure in 1992 when a deputy for operations group maintenance (DOGM) was created to provide overall supervision for all flying squadron maintenance, the phase docks, and interface with the LG commander to resolve issues with back-shop or other supply and/or transportation support of sortie generation and phase activities. Maintenance Control had become the Maintenance Operations Center (MOC) under the wing. Quality Assurance (QA) was also under the wing. The net result for CAF units was to return them more closely to traditional squadron maintenance. The LG's interface with organizational-level maintenance (sortie generation) was minimal except through his/her interface with the OG, and in some instances a maintainer did not fill the LG commander billet.

Several MAJCOMs had Objective Wing variations approved, permitting them to keep all maintenance responsibilities under the

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[44] Ibid., p. 332.

[45] Davis and Walker, p. 21.

LG commander. These were Air Mobility Command (AMC), Air Training Command (ATC), Air Force Special Operations Command (AFSOC), the Air National Guard (ANG), and the Air Force Reserve Command (AFRC).

Two other major changes occurred during the 1990s that would not directly impact the Objective Wing structure but would introduce new considerations into the conduct of maintenance on a broader scale. The first was the formation of the Air Combat Command on June 1, 1992. The distinctions between "tactical" and "strategic" aircraft were blurred by operations in Vietnam (bombers doing tactical missions). During Desert Storm, the Secretary of the Air Force, CSAF, Vice-Chief, and TAC and SAC commanders all spearheaded the drive to integrate the assets of SAC and TAC into a single operational command. At the same time, MAC reorganized by consolidating airlift and most refueling assets under a single umbrella, the new Air Mobility Command (AMC). AMC provided the "global reach" facet of the Air Force mission, while the new ACC provided the Air Force's "global power."[46]

The second change was the formation of the Expeditionary Air Force (EAF) in response to both an evolving world situation with pop-up contingencies in places where the Air Force had rarely operated before, and continuing steady-state regional security commitments far from any Air Force main operating base. The organizational aspects of the transition to the EAF resulted in the designation of ten Air and Space Expeditionary Forces (AEFs) that rotate their availability for deployment and rapid response on a periodic basis. This required the establishment of a global system of CONUS support locations (CSLs), forward support locations (FSLs), and forward operating locations (FOLs), all of which have affected maintenance operations in that units at FOLs are supported much the same way as squadrons at forward bases were supported during the Gulf War.[47]

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[46] "Air Combat Command History," 2002, available at Air Combat Command Web site, http://www2.acc.af.mil/library/history.

[47] Killingsworth, Paul S., et al., *Flexbasing: Achieving Global Presence for Expeditionary Aerospace Forces*, MR-1113-AF, RAND Corporation, Santa Monica, CA, 2000, p. xvii.

The relatively autonomous CAF flying squadron under the Objective Wing was seen as conducive to EAF/AEF operations.

CLR Maintenance Organizational Structure and Conclusions

Throughout its history, the Air Force has moved between centralized and decentralized, standardized and MAJCOM-varied maintenance organizations, often in response to changes in budgets, resources, and technology. Transformation is likely to continue, and organizations will likely continue to evolve to support changing mission requirements within current resource constraints. The objective of the material in this appendix is to provide a historical perspective of the Air Force's maintenance organizational structure to aid decisionmakers in constructing the Air Force maintenance organization of the future.

APPENDIX H

CLR General Officer and Grey Beard Participants

General Officer Steering Group (GOSG) Air Staff Membership

AF/ILM—BG Gabreski (chair)
AF/ILS—BG Mansfield
AF/ILT—BG Peterson
AF/ILX—Ms. O'Neal
AF/XOO—BG Bishop

General Officer Steering Group (GOSG) MAJCOM Membership

AMC—MG Brady
AETC—BG Stewart
AFRC—BG Ryder
USAFE—BG (s) Rooney
AFSOC—Col Mueller
ACC—BG Wetekam
AFMC—BG Sieg
PACAF—BG (s) Collings
ANG—Col Carroll
AFSPC—Col Norwood

Grey Beards

Gen (ret) Viccellio
LG (ret) Marquez, Spectrum
LG (ret) Hall, Spectrum

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General Michael D. Ryan, Chief of Staff of the Air Force, initiated the Chief's Logistics Review (CLR) in late 1999 to develop improvement options for mitigating wing-level logistics problems. The Air Force conducted this review as a joint effort with the RAND Corporation, choosing RAND to act as its analytic advisor. The objective was to target process and process-enabler shortfalls that limited the logistics community's ability to meet increasing readiness demands. A structured methodology focused on identifying process problems and options for their correction. The study presents background information and describes the analytic approach (including RAND's role in its development) and results of CLR (Phase 1). Further, it describes how solution options designed to improve wing-level logistics processes were implemented, tested, and subsequently evaluated at selected air bases (Phase 2). Conclusions and specific issues for further consideration are presented, along with insights that should be of value to Air Force logisticians, operators, and planners faced with maintaining a ready and capable aircraft fleet in new threat and resource environments.

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MG-190-AF